Mitchell D. Roth Mayor

Lee E. Lord Managing Director

West Hawai'i Office 74-5044 Ane Keohokālole Hwy Kailua-Kona, Hawai'i 96740 Phone (808) 323-4770 Fax (808) 327-3563

March 30, 2023

Mary Alice Evans, Director Office of Planning and Sustainable Development Environmental Review Program 235 S. Beretania Street, Room 702 Honolulu, Hawai'i 96813

Dear Ms. Evans,

Subject:Draft Environmental Assessment (DEA) Anticipated Finding of No Significant<br/>Impact (AFONSI)Applicant:Hawaiian Kingdom Brands LLCProject:Hawaiian Kingdom Brands Kanaka Beverage Plant and CafeTMK:(3) 2-2-033:011, South Hilo District, Island of Hawai'i

With this letter, the Hawai'i County Planning Department hereby transmits the Draft Environmental Assessment and Anticipated Finding of No Significant Impact (DEA-AFONSI) for the proposed Hawaiian Kingdom Brands Kanaka Beverage Plant and Cafe project located on the subject parcel (TMK) in Hilo on the Island of Hawai'i for publication in the next available edition of the "Environmental Notice" (*April 8 to May 8, 2023*).

The County of Hawai'i Planning Department has reviewed the referenced project in conformance with Hawai'i Administrative Rules (HAR) Section 11-200.1-13 in order to evaluate the sum of effects of the proposed action on the quality of the environment, and to determine if there will be a "significant effect" on the environment. The thirteen (13) criteria listed in HAR 11-200.1-13(b) have been applied to the proposed project and are discussed in the DEA.

If there are any questions regarding this letter, please contact Alex J. Roy at (808) 961-8140 or via email at <u>alex.roy@hawaiicounty.gov</u>

Sincerely,

Hans Santiago for Hans Santiago for (Mar 30, 2023 11:13 HST)

NORREN KATO Administrative Permits Program Manager

planning@hawaiicounty.gov



Jeffrey W. Darrow Deputy Director

East Hawai'i Office 101 Pauahi Street, Suite 3 Hilo, Hawai'i 96720 Phone (808) 961-8288 Fax (808) 961-8742



**County of Hawai'i** Planning department Mary Alice Evans, Director Office of Planning and Sustainable Development Environmental Review Program March 30, 2023 Page 2

cc via email: Land Planning Hawaii, LLC

From:	webmaster@hawaii.gov		
То:	DBEDT OPSD Environmental Review Program		
Subject:	New online submission for The Environmental Notice		
Date:	Friday, March 31, 2023 10:47:02 AM		

#### **Action Name**

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

#### Type of Document/Determination

Draft environmental assessment and anticipated finding of no significant impact (DEA-AFNSI)

#### HRS §343-5(a) Trigger(s)

• (1) Propose the use of state or county lands or the use of state or county funds

#### **Judicial district**

South Hilo, Hawai'i

Tax Map Key(s) (TMK(s))

(3) 2-2-033:011

#### Action type

Applicant

#### Other required permits and approvals

Special Management Area Use Permit; Plan Approval; Grading and Grubbing Permit; Building Permit; Sewer Extension Application; NPDES Permit; SWPPP Permit; CWRM Well Permit; DOH Drinking Water Permit; Time Extension Request

#### **Discretionary consent required**

Extension of County Sewer line and County Road (within County Right of Way)

#### Approving agency

County of Hawaii Planning Department

#### Agency contact name

Alex Roy

#### Agency contact email (for info about the action)

alex.roy@hawaiicounty.gov

#### Email address or URL for receiving comments

planning@hawaiicounty.gov

#### Agency contact phone

(808) 961-8288

#### Agency address

COUNTY OF HAWAI'I PLANNING DEPARTMENT 101 PAUAHI STREET, SUITE 3 Hilo, HI 96720 United States Map It

## Applicant

Hawaiian Kingdom Brands LLC

#### Applicant contact name

John Pipan

#### Applicant contact email

info@landplanninghawaii.com

#### Applicant contact phone

(808) 333-3393

#### **Applicant address**

347 Andrews Ave. Hilo, HI 96720 United States <u>Map It</u>

#### Was this submittal prepared by a consultant?

Yes

#### Consultant

Land Planning Hawaiii LLC

#### **Consultant contact name**

John Pipan

#### Consultant contact email

info@landplanninghawaii.com

#### **Consultant contact phone**

(808) 333-3393

#### **Consultant address**

194 Wiwoole St. Hilo, HI 96720 United States Map It

#### Action summary

Hawaiian Kingdom Brands (HKB) is proposing to construct a beverage bottling plant and café on the subject parcel. HKB intends to produce bottled water and coffee products for resale in local and non-local markets and construct a café with a drive through for sit-down and takeaway customers. Preliminary plans include a 30,000 square foot warehouse/manufacturing plant for bottling beverages, a new 1,000-foot-deep potable water well, and a 1,360 square foot café with a drive through. A community kitchen is also proposed for public use. On-site infrastructure is expected in the form of driveways, parking, electrical, water supply, storm water management, and wastewater disposal. County water will be used for onsite potable uses and the new potable water well is proposed to serve the bottling plant for water and coffee products.

#### **Reasons supporting determination**

For information on the agency's reasons for supporting the DEA-AFONSI determination, please refer to:

Draft Environmental Assessment PART 4: DETERMINATION, FINDINGS, AND REASONS Section 4.2 Findings and Supporting Reasons

#### Attached documents (signed agency letter & EA/EIS)

- 2023-03-30-Letter-to-Mary-Alice-Evans-OPSD1.pdf
- HKB\_DEA\_2023.pdf

#### Action location map

• HKB Map.zip

#### Authorized individual

Alex Roy

#### Authorization

• The above named authorized individual hereby certifies that he/she has the authority to make this submission.

## **DRAFT ENVIRONMENTAL ASSESSMENT**

## Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

March 2023

#### TMK: (3) 2-2-033: 011 Waiākea Houselots, South Hilo, County of Hawai'i, State of Hawai'i

APPLICANT:

Hawaiian Kingdom Brands LLC 347 Andrews Avenue Hilo, Hawaiʻi 96720

# DETERMINING AGENCY:

County of Hawai'i Planning Department 101 Pauahi Street Suite 3 Hilo, Hawai'i 96720

CONSULTANT:

Land Planning Hawai'i LLC 194 Wiwo'ole Street Hilo, Hawai'i 96720

This document is prepared pursuant to: The Hawai'i Environmental Policy Act, Chapter 343, Hawai'i Revised Statutes (HRS), and Title 11, Chapter 200.1, Hawai'i Department of Health Administrative Rules (HAR)

SUM	MARY	7
PART	<b>1: PROJECT DESCRIPTION AND EA PROCESS</b>	
	1.1 Project Description and Location	14
	1.2 Purpose and Need	
	1.3 Cost and Schedule	
	1.4 Environmental Assessment Process	
	1.5 Public Involvement and Agency Coordination	32
PART	Γ 2: ALTERNATIVES	
	2.1 Proposed Project, Alternative Sites, and Alternative Uses	
	2.2 No Action	
PART	<b>[ 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION</b>	
	3.1 Physical Environment	
	3.1.1 Geology, Geologic Hazards, and Soil	
	3.1.2 Hydrologic Resources	39
	3.1.3 Flood Zones and Shoreline Setting	
	3.1.4 Water Quality	
	3.1.5 Flora and Fauna.	
	3.1.6 Air Quality, Noise, and Scenic Resources	
	3.2 Socioeconomic and Cultural	90
	3.2.1 Land Use, Socioeconomic Characteristics and Recreation	
	3.2.2 Cultural and Historic Resources	
	3.3 Public Roads, Services and Utilities	
	3.3.1 Roads and Access	
	3.3.2 Public Utilities and Services	116
	3.4 Secondary and Cumulative Impacts	120
	3.5 Required Permits and Approvals	122
	3.6 Consistency with State and County Plans, Policies, and Laws	123
	3.6.1 Hawai'i County General Plan	123
	3.6.2 Hawai'i County Zoning and Special Management Area	129
	3.6.3 EnVision Downtown Hilo 2025	136
	3.6.4 Water Rights	137
	3.6.4.1 Hawai'i Constitutional Public Trust Doctrine	138
	3.6.4.2 Hawai'i State Water Code	140
	3.6.4.3 Correlative Rights Doctrine	144
	3.6.5 Conservation District	145

## **Table of Contents**

PART 4: DETERMINATION, FINDINGS AND REASONS	145
4.1 Determination	145
4.2 Findings and Supporting Reasons	145
REFERENCES	152

## Tables

Table 1: SWPPP Sequence and Details of Construction Activities	75
Table 2: SWPPP Potential Construction Site Pollutants and Mitigating Measures	
Table 3: SWPPP Definitions of Storm Water Control Measures	77
Table 4: Flora Found on the Subject Property	82
Table 5: Peak Hour Pedestrian and Bicycle Volumes	
Table 6: Existing (2022) Level of Service	
Table 7: Estimated Vehicular Trips to be Generated by the Island Naturals Complex	
Table 8: 2027 Future LOS Conditions Without Project	103
Table 9: 2032 Future LOS Conditions Without Project	105
Table 10: 2042 Future LOS Conditions Without Project	107
Table 11: Project Related Development Phasing and Trips Generated	108
Table 12: 2018 HPMS Surrounding Roadway Volumes	108
Table 13: 2027 Future LOS Conditions with Project	109
Table 14: 2032 Future LOS Conditions with Project	110
Table 15: 2042 Future LOS Conditions with Project	111

## Figures

Figure 1: Location Map	9
Figure 2: Site Photo 1	10
Figure 3: Site Photo 2	11
Figure 4: Site Photo 3	12
Figure 5: Site Photo 4	13
Figure 6: Google Earth Satellite Image of Subject Property and Surrounding Area	14
Figure 7:Site Plan	18
Figure 8: Café Floor PLAN	19
Figure 9: Beverage Bottling Plant Floor Plan	20
Figure 10: Conceptual Design of the Beverage Bottling Plant	21
Figure 11: Beverage Bottling Plant 1	22
Figure 12: Beverage Bottling Plant 2	23
Figure 13: Beverage Bottling Plant 3	24
Figure 14: Beverage Bottling Plant 4	25
Figure 15: Beverage Bottling Plant 5	26
Figure 16: Beverage Bottling Plant 6	27
Figure 17: Beverage Bottling Plant 7	28
Figure 18: Schematic Drawing of the Proposed Deep Well	29
Figure 19: Underground Injection Control Line in Relation to the Subject Property	33

Figure 20: Map of 1984 Mauna Loa Lava Flow Advancing Toward Hilo	35
Figure 21: Mauna Loa Flow Approaching Hilo; View from Hilo Airport on April 4, 1984	35
Figure 22: Map of Historic Mauna Loa Flows	36
Figure 23: 2021 USGS Model of Earthquake Probability for the Hawaiian Islands	37
Figure 24: Diagram of Rainfall Formation over the Hawaiian Islands	40
Figure 25: Hydrological Features of a Typical Basal Aquifer in Hawai'i	41
Figure 26: Hydrological Cycle of the Hawaiian Islands	42
Figure 27: Geochronology of Mauna Kea, Shield and Post Shield Volcanics	43
Figure 28: Conceptual Mauna Kea Ground Water Model	45
Figure 29: Isotopic Composition Changes of the Hydrological Cycle	46
Figure 30: Graph of Isotopic Composition Changes of Water with Elevation	46
Figure 31: Topographic Map of Area and Direction of Recharge from Mauna Kea to the Su	bject
Aquifer	48
Figure 32: Rainfall Atlas of Mauna Kea	49
Figure 33: Rainfall Atlas of Hawai'i Island	50
Figure 34: Diagram of Water Bearing Pillow Lavas Recharge from Mid-Elevations	51
Figure 35: Historical Carbon Dioxide Levels in the Atmosphere in Parts Per Million	55
Figure 36: Indicators of Climate Change in the Pacific Islands	56
Figure 37: Drought Severity Map of the Island of Hawai'i	57
Figure 38: Aquifer Sector and System Areas of Hawai'i Island	60
Figure 39: Topographic Map of Area and Direction of Recharge from Mauna Kea to the Su	bject
Aquifer	61
Figure 40: Existing Demands of the Hilo and Onomea Aquifer System Areas 2016	63
Figure 41: Tsunami Evacuation Zone in Relation to the Subject Property	66
Figure 42: Flood Insurance Rate Map of the Subject Property	67
Figure 43: Potential Tsunami Travel Times in the Pacific Ocean	68
Figure 44: 3.2 Foot Sea Level Rise	70
Figure 45: DOH Clean Water Branch Impaired Waterways Map	72
Figure 46: SWPPP Best Management Practices Site Plan	79
Figure 47: SWPPP Stabilized Construction Entrance and Washout Basin Details	80
Figure 48: SWPPP Filter Sock and Silk Fence Detail	81
Figure 49: 1965 USDA Aerial Photo of the Subject Property	94
Figure 50: 1977 USDA Aerial Photo of the Subject Property	94
Figure 51: TIAR Study Intersections	96
Figure 52: Study Intersection Regional Traffic Volume Movements	100
Figure 53: 2027 Future Without Project Peak Hour Volumes	102
Figure 54: 2032 Future Without Project Peak Hour Volumes	104
Figure 55: 2042 Future Without Project Peak Hour Volumes	106
Figure 56: 2027 Future With Project Peak Hour Volumes	110
Figure 57: 2032 Future With Project Peak Hour Volumes	112
Figure 58: 2042 Future With Project Peak Hour Volumes	114
Figure 59: Wastewater Division Map of Subject Area	119
Figure 60: Water Management Areas of the State of Hawai'i	
Figure 61: Graph of the State of Hawai'i Water Plan	142

## Appendices

- Appendix A: Environmental Site Assessment
- Appendix B: Storm Water Pollution Prevention Plan
- Appendix C: Archaeological Inventory Survey
- Appendix D: Traffic Impact Analysis Report Appendix E: Comments in Response to Early Consultation

#### Abbreviations

AMSL	Above Mean Sea Level		
AWSC	All-Way Stop Controlled		
ASTM	American Society for Testing and Materials		
AFONSI	Anticipated Finding of No Significant Impact		
AIS	Archaeological Inventory Survey		
AADT	Average Annual Daily Traffic		
B.P.	Before Present		
BMP	Best Management Practices		
CWA	Clean Water Act		
CZM	Coastal Zone Management		
CWRM	Commission on Water Resource Management		
DOH	Department of Health		
DLNR	Department of Land and Natural Resources		
DPW	Department of Public Works		
DWS	Department of Water Supply		
DOFAW	Division of Forestry and Wildlife		
DEA	Draft Environmental Assessment		
EA	Environmental Assessment		
EIS	Environmental Impact Statement		
EPA	Environmental Protection Agency		
FEMA	Federal Emergency Management Agency		
FEA	Final Environmental Assessment		
FONSI	Finding of No Significant Impact		
FIRM	Flood Insurance Rate Map		
GPD	Gallons Per Day		
GPM	Gallons Per Minute		
GP	General Plan		
GHG	Greenhouse Gases		
GDE	Groundwater Dependent Ecosystems		
HAR	Hawai'i Administrative Rules		
HCCMAC	Hawai'i Climate Change Mitigation and Adaptation Commission		

HDOT	Hawai'i Department of Transportation
HEPA	Hawai'i Environmental Policy Act
HGGRC	Hawai'i Groundwater & Geothermal Research Center
HRS	Hawai'i Revised Statutes
HSDP	Hawai'i Scientific Drilling Project
HELCO	Hawaiian Electric Light Company
HKB	Hawaiian Kingdom Brands
HPMS	Highway Performance Monitoring System
HGRP	Humu'ula Groundwater Research Project
IPCC	International Panel on Climate Change
ITE	International Transportation of Engineers
JD	Jurisdictional Determination
LUPAG	Land Use Pattern Allocation Guide
LOS	Level of Service
LID	Low Impact Development
MUTCD	Manual on Uniform Traffic Control Devices
MGD	Million Gallons Per Day
NASA	National Aeronautics and Space Administration
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
OPSD	Office of Planning and Sustainable Development
PIRCA	Pacific Islands Regional Climate Assessment
PTA	Pōhakuloa Training Area
RAM	Robust Analytical Model
SMA	Special Management Area
SHPD	State Historic Preservation Division
SWC	State Water Code
SWPP	Storm Water Pollution Prevention Plan
SY	Sustainable Yield
TMDL	Total Maximum Daily Loads
TWI	Trade Wind Inversion
TWSC	Two-Way Stop Controlled
UV	Ultraviolet
UIC	Underground Injection Control
USDM	United State Drought Monitor
USGS	United States Geological Survey
WMA	Water Management Area
WQS	Water Quality Standard
WRPP	Water Resource Protection Plan
WUDP	Water Use Development Plan

# SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS, AND MITIGATION MEASURES

Hawaiian Kingdom Brands (HKB) is proposing to construct a beverage bottling plant and café on the subject site located at 525 Pi'ilani Street. The parcel identified as Tax Map Key (TMK) (3) 2-2-033: 011 lies on the northeast corner of Pi'ilani Street and Mililani Street in the Waiākea Houselots (herein referred to as "Property") (**Figure 1-5**). The site is 2.57-acres of land zoned Limited Industrial ML-20 under Ordinance 1992-122. Sole access to the site is off Pi'ilani Street.

The subject Property is within the Special Management Area (SMA), roughly 625 feet east of the Wailoa River/Waiākea Fishpond. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north.

HKB intends to produce bottled water and coffee products for resale in local and non-local markets and construct a café with a drive through for sit-down and takeaway customers. Preliminary plans include a 30,000 square foot warehouse/manufacturing plant for bottling beverages, a new 1,000-foot-deep potable water well, and a 1,360 square foot café with a drive-through. A community kitchen is also proposed for public use.

On-site infrastructure is expected in the form of driveways, parking, electrical, water supply, storm water management, and wastewater disposal. Electricity will be provided by a Hawaiian Electric Light Company (HELCO) connection and solar panels. County water will be used for onsite potable uses. Estimated County water use calculations will be submitted to DWS for review and approval. The Department of Water Supply does not allow the use of County water for bottling and resale. Therefore, a new 1,000-foot-deep potable water well is proposed to serve the bottling plant for water and coffee products. A deep well is being proposed because it would utilize water under artesian pressure, which would require less treatment and wastewater compared to water from the county aquifer. An exploratory and development Well Permit will be applied for after the SMA Use Permit and amendment to the Rezoning Ordinance have been approved. Details of the well and drilling rig can be found in Section 1.1.

Off-site infrastructure improvements will be required to support traffic and wastewater. A Traffic Impact Analysis Report (TIAR) was completed on July 6, 2022, by SSFM International and is summarized in Section 3.3.1 of this DEA. The proposed project would also require the extension of the County sewer line from its terminus near the intersection of Pi'ilani and Mililani Street. The line is proposed to be extended north from Mililani Street to mitigate impacts to Pi'ilani Street. A detailed discussed on wastewater and measures to mitigate potential impacts to water quality can be found in Section 3.1.4.

Total construction costs are estimated at roughly \$5,000,000. Construction is planned to commence upon completion of permitting and design, with full buildout by 2025. Construction activities would produce minor short-term impacts to noise, air quality, and scenic views, which will be mitigated by Best Management Practices (BMPs). Potential impacts to noise, air quality, and scenic resources during operation will be discussed in detail in Section 3.1.6.

A biotic survey conducted on September 14, 2022, confirmed that no endangered or threatened species exist on the Property. The site was recently cleared under SMA minor permit PL-SMM-2022-000012, approved by the Planning Department on January 16, 2022. Typical vegetation that remains on the Property includes non-native trees, vines, and grasses. One native plant known as Kauna'oa kahakai (*Cuscuta sandwichiana*) was also detected, although it was not rooted in the ground.

An Environmental Site Assessment was completed for the subject site in 2018. No current or past evidence of contaminants were found on the Property. A Storm Water Pollution Prevention Plan (SWPPP) was drafted for this Environmental Assessment and is summarized in Section 3.1.4.

An Archaeological Inventory Survey (AIS) determined the presence of one historical site (Site 50-10-35-1481.2). It is a concrete slab interpreted as an historic foundation or walkway, a remnant of previous industrial uses on site, which is significant for yielding information for understanding historic activity in the area. According to the AIS, the mapping, written descriptions, and photography of Site 1481.2 adequately document it. No further work or preservation has been recommended. The survey also found four 'displaced isolated objects' but they are not considered significant historical resources.

It is not known whether the Property has been previously used for traditional and customary rights by native Hawaiians. It is unlikely to be used as such today due to previous development and land use on the Property over the past few decades. In the unlikely event that undocumented archaeological or cultural resources, including shells, bones, midden deposits, lava tubes, or current traditional and customary gathering rights are discovered, all work will cease, and the State Historic Preservation Division will be contacted immediately to determine appropriate action.

The proposed action does not conflict with County or State laws. Discretionary permits required for the proposed action include a Special Management Area Use Permit (SMA-Major) and a Time Extension Request to complete the outstanding conditions of Rezone Ordinance 1992-122. Ordinance 1992-122 changed the district classification of the Property from Resort-Hotel, Safety (V-5-.75) to Limited Industrial (ML-20) in 1992. Other permits and approvals required at the State and County level can be found in Section 3.5. Establishment of the proposed use will not be contrary to the objectives sought to be accomplished by State Land Use Laws and Regulations.











## PART 1: PROJECT DESCRIPTION AND EA PROCESS

## 1.1 Project Description and Location

The subject site is located on an undeveloped lot on the northeast corner of Pi'ilani Street and Mililani Street, roughly 300 feet west of the Pi'ilani and Manono Street intersection. Mililani Street is undeveloped north of Pi'ilani Street, therefore current access is solely off Pi'ilani Street.

The subject Property is roughly 625 feet east of the Wailoa River/Waiākea Fishpond. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north. Surrounding land uses include the Hilo marina located roughly 1,300 feet to the north, Ho'olulu Park located roughly 450 feet to the east, The Manono mini mart convenience store located 130 feet to the south, and Wailoa Plaza and Waiākea Villas roughly 1,000 feet to the southwest (**Figure 6**).



Figure 6: Google Earth Satellite Image of Subject Property and Surrounding Area

According to Planning Department records, the Property has the following permit history:

- 1. July 24, 1991: the General Plan Amendment Ordinance No. 91 72, changed the Land Use Pattern Allocation Guide (LUPAG) map designation from Medium-Density Urban to Industrial for the subject Property.
- 2. September 1, 1992: SMA Major Permit (SMA) 334) was approved for a fish processing center but has since been revoked (by the previous landowner) and is no longer valid.
- 3. November 20, 1992: Effective date of Change of Zone Ordinance No. 92 122, which changed the zoning of TMKs 2-2-033: 011, 012, 019 and 020 totaling 2.5712 acres from the Resort-Hotel-Safety-7,500 square feet (V-S-7.5) district to the Limited Industrial-20,000 square feet (ML-20) zoning district.

- 4. October 24, 1994: Effective date of final approval for Consolidation 831-Revised, which consolidated TMKs 2-2-033: 011, 012, 019, and 020 into one lot identified by the current TMK: (3) 2-2-033: 011.
- 5. 2018 SMA Use Permit Application (SMA-18-000070) was submitted to develop a potable water well and bottling facility with related improvements. The project was denied by the Windward Planning Commission in 2020.
- 6. January 16, 2022, a SMA minor permit (PL-SMM-2022-000012) was granted to the current applicant for land management activities including clearing the Property of overgrown invasive trees and shrubs, and construction of a fence around the Property perimeter.

The proposed action would include both onsite and offsite improvements including buildings, driveways, a potable water well, infrastructure for electrical, water supply, storm water and wastewater management, roadway development, and County sewer line extension.

Proposed onsite infrastructure includes a 30,000 square foot warehouse/manufacturing plant for beverage bottling, a 1,000-foot-deep potable water well, and a 1,360 square foot café. Three (3) driveways are proposed, including one (1) covered drive-thru. Seventy-eight (78) parking stalls would serve the site including four (4) accessible stalls. One (1) loading dock, a delivery area, and three (3) truck stalls would serve the bottling plant. An outdoor patio is also proposed for the café. The proposed well will be placed on an 8 x 16-foot concrete pad located inside the proposed warehouse. A propane storage tank will be used for both coffee roasting and kitchen activities. **Figures 7-17** show the preliminary site plan, floor plans and conceptual designs. Utility poles are located on the northeast and southeast corners of the parcel. Electricity will be provided via Hawaiian Electric Light Company (HELCO) and solar panels.

The subject Property is located above 'unconfined basal aquifers' recognized by the State of Hawai'i Commission on Water Resource Management (CWRM) as the Hilo Aquifer (80401) and the Onomea Aquifer (80204). These basal aquifers are used as municipal water sources. Hawaiian Kingdom Brands is proposing to withdraw potable water from a 'deep confined aquifer', which is located below an impermeable layer of ash and clay that separates it from the Hilo and Onomea unconfined basal aquifers.

The 'deep confined aquifer' was discovered by the Hawai'i Scientific Drilling Project (HSDP) in 1993. This aquifer is located roughly 1,000 feet below sea level and is 'confined' by a 100-foot-thick soil layer that is identified as the contact surface between Mauna Loa and Mauna Kea lavas. This impermeable soil layer separates the deep confined aquifer from the Hilo and Onomea basal aquifers located above it.

The applicant hopes to establish a source of the fresh artesian water found in the deep confined aquifer to develop a potable beverage processing facility in addition to the proposed café. An exploratory drill would first need to be conducted using a 12-inch borehole to the depth of 1,050 feet. If the fresh ground water source is encountered, the 'artesian zone' would be isolated using an inflatable packer. The water source would then be tested in coordination with the Commission on Water Resource Management and the Department of Health. Pump tests will be done in collaboration with CWRM to ensure no impacts to the aquifer will occur through saltwater

upconing or excessive drawdown, that the recharge boundary does not indicate impacts to other resources, and that the use is far below the sustainable yield.

The water from the subject aquifer is expected to be of very high quality and will be treated with nanofiltration and UV sterilization. If the water complies with the Department of Health's (DOH) standards for drinking water, then the well will be completed for production. However, if the water quality falls below expectations and extensive nanofiltration and UV sterilization is necessary, the project may not move forward due to financial feasibility concerns.

The steps to complete the well for production would consist of reaming the 12-inch borehole to 19 inches, installing 12-inch diameter stainless steel solid and louvered casing, and cementing the annular space so that the well draws water exclusively from the fresh artesian zone at depth. The drill rig itself would be placed on an 8 by 16-foot concrete pad on the west side of the loading dock/delivery area proposed for warehouse/manufacturing plant. No hazardous materials will be used during the drilling process that could potentially contaminate ground water resources. **Figure 18** is a schematic drawing of the proposed well.

Supply of the water from the proposed deep confined aquifer would have no impact on existing ground water uses. No ground water use currently taps into this fresh artesian water at depth. If in the unlikely scenario the well is found to impact basal water sources during testing, then Hawaiian Kingdom Brands will refer to CWRM for course of action.

An Environmental Site Assessment completed in 2018 found no evidence of current or past contamination on the subject site. The complete report can be found in **Appendix A**. A Storm Water Pollution Prevention Plan was developed to outline Best Management Practices during and after construction to prevent storm water from impacting other sites and the Wailoa River/Waiākea Fishpond. The full report can be found in **Appendix B**. An Archaeological Inventory Survey (AIS) determined the presence of one historical site (Site 50-10-35-1481.2). The site is adequately documented, and no further work or preservation is recommended. The full AIS report can be found in **Appendix C**.

Offsite infrastructure improvements are expected in the form of roadway improvements and an extension of the County sewer line. Mililani Street is proposed to be extended north from Pi'ilani Street along the west side of the parcel to County dedicable standards. The TIAR discusses two (2) potential future road alternatives to mitigate anticipated traffic impacts in 2032 and 2042 at the Pi'ilani and Manono Street intersection. These will be discussed in Section 3.3.1. The full TIAR report can be found in **Appendix D**.

The County sewer line is proposed to be extended north from its terminus near the intersection of Mililani Street and Pi'ilani Street. Wastewater from water bottling activities is expected to be minimal due to the proposed filtration process, which would utilize nanofiltration and Ultraviolet (UV) light disinfection. Compressed air would be used to "rinse" bottles before they are filled to minimize water use and wastewater. Wastewater produced from coffee roasting is not expected to be significant.

County water is available to the site via an existing six (6) inch waterline within Pi'ilani Street fronting the subject Property. The parcel is served by an existing 5/8-inch meter, which allows a maximum daily usage of 600 gallons. County water will be used for onsite potable use only, not bottled for sale. Estimated County water use calculations will be submitted to DWS for review and approval. The Department of Water Supply does not allow the use of County water for bottling and resale. Therefore, a new 1,000-foot-deep potable water well is proposed to serve the warehouse/manufacturing plant to bottle water and coffee products.

Bottled beverages are proposed to be sold in both local and non-local markets. Glass bottles will be used for local market sales. In the event of supply shortages, recycled plastic bottles may be used for non-local market sales.

The café kitchen will be available for community use outside of café open hours. Interested community members will be able to sign up to schedule time in the kitchen for a small fee. No fee will apply to non-profit organizations and native Hawaiians. The community kitchen will not support food trucks and will not host community events or classes.



	PLANNING DEPARTME HAWAII COUNTY COD	<u>ENT</u> E - Chapter 25				
	Scope of Work New 30,000 sq ft New <u>1,360</u> sq ft total <u>31,360</u> sq ft	Beverage Factory cafe	,		E	
	Owner Name TALON1PROPE	RTIES LLC Fee Ow	ner, Tenants in Severalt	ty		ERING
	Owner Address TALON1PROPER 3333 E CAMELBA PHOFNIX AZ 850	RTIES LLC ACK RD STE 275 )18 2386				IN E K S
	Building Location Addre 525 PI'ILANI STR HILO, HAWAI'I	ss EET			455 E. Lanik Hilo, Hawa Main (808) www.epi	i`i 96720 933-7900 inc.pro
	Tax Map Key (3) 2 - 2 - 033: 01	1				
	Parcel area 112,000 square fe	et (2.5712 acres)				
	State Land Use District U - Urban					
UTILITY POLE	Flood Zone Zone X					
	Zoning (Section 25-5-140) ML -20 Limited Industrial	Districts				
	Permitted use (Section 25-5-142) (25) Food manufa	acturing and proce	ssing facilities			
	Height Limit (Section 25-5-143) <u>Height limit</u> 45'-0"	IBC (table 504.3 75'-0"	3) <u>Actual height</u> x			
	Minimum yards (Section 25-5-146) (1) Front or rear y	ards, fifteen feet Actual 86'-0" fro	ont yard			
existing Utility Pole	(2) Side yards, no RD, RM, or RCX	one, except where district. Adjoining Lots \	e the adjoing buildii / -7.5	ng site is in an RS,		
	Landscaping of yards (Section 25-5-117) (a) All front yards necessary access on single-family d	in the CG district drives and walkw welling and acces Provided 10'-0"	shall be landscape vays, and except fo sory buildings per l front landscaping	d, except for r the construction of ot.		Z RE RE
	Required number of par	king spaces				, 202
	(Section 25-4-51 (4)) ML (Industrial):	One for each 40 31,360 sq ft divi spaces Provided 78 par	00 sq ft of gross floo ded by 400 sq ft = king spaces	or area 78 required parking		
FIRE HYDRANT	Parking for person with (Section 25-4-55) Total Parking on Bldg Site and Req Min	disabilities No of Accessible <u>Space</u>	Actual Accessible <u>Space</u>			DATE REV. REV.
	76 to 100 Off-street loading requir	4 ements	4		8	
	(Section 25-4-56) 3 Use of Use <u>Category</u> Commercial	Floor Area in <u>Square Feet</u> 30,001-40,000	Loading Space <u>Requirements</u> 4	Actual <u>Loading Space</u> 4 (12'wide x 50' long x 14' vertical clearance)	AGE	AFE
					FOR:	
					EV	
					W B(	<b>АЛ</b> ,0, н
					NE NE	X III
					DRAWN BY: EPI CHECKED BY:	DESIGNED BY: EPI
					BF	YWF NO
			Fig	ure 7	17260- DWG.	21-01 NO.
			8			





uction	
nt Description	Rating
e	0 hour
ls and partition Interior	0 hour 0 hour 0 hour
oporting beam and joists	0 hour
oporting beam and hoists	0 hour

Total Occu- factor	Req <u>Exits</u>	Provide <u>Exits</u>
5	1	2
1	1	1
1	1	3
2	1	1

- -

9 Total occupant



# Figure 8





















#### 1.2 Purpose and Need

The purpose of the proposed project is to produce high quality products, employ residents, and give back to the community. Hawaiian Kingdom Brand's mission statement states, "Our mission is to provide world class products and high-quality beverages made locally. Our company is focused on employing local people and supporting the local economy. This company will be a visible reminder to the world that the Hawaiian kingdom exists. Our intention is to live Aloha and share Aloha with the world."

The proposed project would provide various employment opportunities for residents including construction workers, waiters, warehouse/manufacturing plant operators, and truck drivers. The objective of the project is to use all locally grown products, such as coffee bean, vanilla, milk products and alternatives, fruits, and vegetables. These purchases will support local agricultural businesses and coffee farmers. A commercial kitchen is also proposed on site and a marketing web portal for community use. The proposed project would bring tax revenue to the State and County and would have a positive impact on exporting vs. importing goods. The proposed project would also become a convenient resource for nearby public spaces such as Wailoa Park, Afook-Chinen Civic Center/Ho'olulu Park, and Liliu'okalani Gardens.

A board will be established to maintain and uphold the integrity and established goals of the company, which is rooted in community benefit and give back. This board will be made up of all Native Hawaiians who will be part of the company's decision-making processes.

The project will also allow the company to give back to the community through events such as beach cleanup days. Several outreach meetings have been conducted throughout the community over the past several months to present the project concept and solicit feedback.

### 1.3 Cost and Schedule

The proposed action to construct a 30,000 square foot beverage bottling plant and 1,360 square foot café with a drive through is expected to cost roughly \$5,000,000. This includes the drilling/construction cost of the proposed deep well. Construction is anticipated to begin in 2023 and be completed by 2024-2025. See Section 3.5 for a list of the required County and State permits and approvals that must be obtained before construction can commence.

#### **1.4 Environmental Assessment Process**

In 1974 the Hawai'i State Legislature enacted the Hawai'i Environmental Policy Act (HEPA), which requires State and County agencies to conduct an environmental impact analysis prior to making decisions on actions that may impact the environment.

This Environmental Assessment (EA) is being conducted in accordance with Chapter 343 of the Hawai'i Revised Statutes (HRS), along with the implementing regulations, Title 11, Chapter 200.1, of the Hawai'i Administrative Rules (HAR). This law is the basis for the environmental impact assessment process in the State of Hawai'i. An EA is necessary for the proposed project as improvement of County land would be required. This includes the extension of the Mililani Street Right-of-Way north to the west side of the subject site, extension of the County sewer line north from its terminus near the intersection of Mililani Street and Pi'ilani Street, and possible intersection improvements.

According to Chapter 343, an EA is prepared to determine impacts associated with a proposed action, develop mitigation measures for any discovered adverse impacts, and determine whether the impacts are significant (according to the thirteen specific criteria). If a study concludes that no significant impacts would occur from implementation of the proposed action, a Finding of No Significant Impact (FONSI) is prepared. If a study finds that significant impacts are expected to occur because of a proposed action, then an Environmental Impact Statement (EIS) is prepared to allow deeper investigation of impacts and allow more extensive public involvement.

The following EA discusses alternatives to the proposed action, existing environment and impacts associated with the proposed action, the anticipated determination and the findings made by the applicant in consultation with the County of Hawai'i Planning Department and the expert consultants who prepared supporting studies for this EA.
### 1.5 Public Involvement and Agency Coordination

Agency coordination and public involvement are crucial components of the environmental assessment process to understand the impacts caused by the proposed action. The agencies, organizations, and individuals below have been consulted as part of the environmental assessment process. Copies of correspondence during the early consultation period can be found in **Appendix E.** 

### State:

- Department of Land and Natural Resources, Land Division
- Department of Land and Natural Resources, Division of Aquatic Resources
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- Department of Land and Natural Resources, Office of Conservation & Coastal Lands
- Department of Land and Natural Resources, Engineering
- Department of Land and Natural Resources, Historic Preservation
- Hawai'i Department of Transportation
- Office of Hawaiian Affairs
- Sierra Club of Hawai'i
- The Nature Conservancy of Hawai'i
- State Department of Health
- Office of Planning and Sustainable Development
- Commission on Water Resource Management
- U.S. Army Corps of Engineers

### County:

- Planning Department
- Fire Department
- Police Department
- Department of Environmental Management
- Department of Public Works
- Department of Water Supply
- Civil Defense
- Aha Moku of Hilo

### Private:

- Dr. Donald Thomas, Geochemist, Hawai'i Institute of Geophysics and Planetology (HIGP), School of Ocean and Earth Science and Technology (SOEST), University of Hawai'i at Mānoa
- Surrounding Property Owners within 300 feet of subject parcel
- Tom Nance, Water Resource Engineer
- Hawaiian community members through public outreach meetings

### **PART 2: ALTERNATIVES**

### 2.1 Proposed Project, Alternative Sites, and Alternative Uses

There are no other action alternatives that could meet the purpose and need of the project. The proposed action requires Industrial zoning and thus has limited site alternatives. No other alternative sites have been identified and are therefore not discussed in this Environmental Assessment.

The Department of Water Supply does not allow the use of County water for bottling and resale; therefore, the use of County water for bottled beverages is not an alternative option. Water from the shallow unconfined basal aquifer is also not an option due to the location of the property in relation to the Underground Injection Control (UIC) line.

According to the State Department of Health, the Underground Injection Control (UIC) line was established to protect ground water resources with drinking water potential. The line determines where injection wells are prohibited. Areas *mauka* of the line are considered potential drinking water sources from the Hilo Aquifer. This is where most municipal water comes from. In contrast, areas *makai* of the line are considered non-potable. The subject Property lies *makai* of the UIC line. **Figure 19** shows the Underground Injection Control Line in relation to the subject Property. Areas located *makai* of the line are highlighted in blue.



Figure 19: Underground Injection Control Line in Relation to the Subject Property

### 2.2 No Action

Under a No Action alternative, the beverage bottling plant and café would not be built, and no improvements would be made to the land. The lot would remain clear and undeveloped. This EA considers the No Action alternative as the baseline for this project and all environmental effects will be based off this alternative.

### PART 3: ENVIRONMENTAL SETTING, IMPACTS, AND MITIGATION

### **3.1 Physical Environment**

The subject Property is located roughly 625 feet east of Wailoa River/Waiākea Fishpond, which is contiguous with Hilo Bay and the Pacific Ocean. The mouth of the Wailoa River, where it enters Hilo Bay, is approximately 2,300 feet north. The topography of the subject site is relatively flat with an elevation of approximately 11-16 feet above mean sea level (msl). The topography directs surface flow towards the west.

### 3.1.1 Geology, Geological Hazards, and Soils

### Environmental Setting: Volcanic Activity

The subject Property is located on the northeastern flank of Mauna Loa Volcano. The site is in Lava Zone 3, on a scale ranging from 9 to 1, ranking least hazardous to most. Mauna Loa is the largest active volcano on earth, rising over 13,500 feet above sea level and extending to a depth of 16,400 feet below sea level. The sea floor is depressed another 26,250 feet due to the volcano's enormous mass. Therefore, from the base to the summit, Mauna Loa is more than 56,000 feet high (HVO, 2022).

Since 1843, Mauna Loa has erupted 33 times with an average of one eruption every five years. Exceptions to this pattern occurred during a 25-year hiatus between 1950 and 1975 and a 38-year hiatus from 1984 to 2022. On Sunday November 27, 2022, an eruption began in the summit caldera, Moku'āweoweo. After some hours, new fissures opened along the Northeast Rift Zone. By December 2, the eruption was limited to one fissure, which advanced less than 2 miles from Saddel Road. On December 13, 2022, the eruption ceased.

The most recent lava flow to threaten Hilo occurred in 1984. The flow reached within 4 miles of the city center. **Figure 20** shows a lava flow map depicting the advancement (identified as flow "F"). **Figure 21** is a photo of the lava flow taken from the Hilo Airport on April 4, 1984. The 1984 lava flow remains the first and only Mauna Loa eruption to have been well monitored and documented. Hawaiian Volcano Observatory (HVO) scientists were able to collect detailed observations of activity at vents located on the northeast rift zone and points along the lava channels that were moving towards Hilo. The data collected has developed current flow models that forecast how long a lava flow may extend, and what path it could potentially take, to better evaluate and protect Hilo against future lava flow threats (HVO, 2022).

Despite Mauna Loa's active history, the subject Property has not been inundated by a lava flow for 1,000 to 2,000 years. The Property is located on a Mauna Loa flow identified as the Pana'ewa picrite flow (p2l2), which occurred 1,000 to 2,000 years Before Present (B.P.). The composition of the flow is pāhoehoe with greater than 5 percent olivine and plagioclase (**Figure 22**). 'A'ā lavas associated with this flow are located to the south. Also located to the south is the 'Āinaola Drive picrite flow (p10e1), which occurred 9,000 to 10,000 years B.P. with over 15 percent olivine content. To the west of the Property, on the other side of Waiākea Fishpond, is the Kino'ole Street flow (a9j3). This lava flow is 8,000 to 9,000 years B.P. and has a mixed composition of olivine and plagioclase (Trusdell and Lockwood, 2017).



Figure 20: Map of 1984 Mauna Loa Lava Flow Advancing Toward Hilo



Figure 21: Mauna Loa Flow Approaching Hilo; View from Hilo Airport on April 4, 1984

### Map of Previous Mauna Flows in Relation to the Subject Property



Figure 22

### Environmental Setting: Earthquake Activity

The USGS recently came out with a model of earthquake probability for the Hawaiian Islands, which better estimates hazard probability compared to previous models. The ground shaking model indicates that Hawai'i Island has a greater than 90 percent chance of experiencing an earthquake with slight (or greater) damage during the next 100 years (**Figure 23**).



Figure 23: 2021 USGS Model of Earthquake Probability for the Hawaiian Islands

The Hilo area is susceptible to ground shaking from earthquakes originating near Mauna Loa and Kīlauea volcanoes. It is not uncommon to experience frequent slight tremors in Hilo as a result. Larger events, however, occur much less frequently and are more difficult to predict.

Three significant earthquake events to cause structural damage in Hilo occurred in 1973, 1975, and 2018. In 1973, a magnitude-6.2 earthquake struck 29 miles beneath the town of Honomu, just north of Hilo. The depth of the earthquake is what caused such widespread and severe damage. Eleven people were reported injured in Hilo, four of which were hospitalized. An unknown number of injuries were also reported in Waimea. Approximately \$5.6 million dollars of structural damage was recorded across the island (~\$40 million today). In 1975, a magnitude-7.2 earthquake struck the southern flank of Kīlauea volcano near the town of Kalapana and caused significant shaking throughout the entire island. This earthquake event also caused significant subsidence along southeastern shores of the island. Most recently, the 2018 Kīlauea eruption proved to be historic in many ways, including the magnitude-6.9 earthquake that rattled the entire island. This earthquake caused significant shaking throughout Puna and Hilo. There were even some reports of shaking as far as O'ahu.

Mauna Loa is not currently erupting but continues to produce small-magnitude (below M3.0) earthquakes below the summit and upper-elevation flanks. During the first week of August 2022, a swarm of over 200 earthquakes below a magnitude-3.0 were recorded in this area. The majority of these earthquakes occurred at shallow depths less than 9 miles below sea level. According to the Hawaiian Volcano Observatory (2022), "This activity is a relatively small increase in volcanic unrest and remains within the range of fluctuations observed over the past several years." Mauna Loa has an Alert Level of "Advisory" and Color Code, "Yellow" because rates of seismicity remain slightly elevated above long-term background levels.

#### Environmental Setting: Soil

Soils on the subject Property are made up of Opihikao-Urban land complex (*2kll8*) with 2 to 20 percent slopes. These soils are made up of organic material over pāhoehoe lava flows, they are well drained, and have a high runoff class. This Property is not considered to be prime farmland and has a soil classification of D (Web Soil Survey, 2022).

#### Impacts and Mitigating Measures

The proposed action will not increase the potential of volcanic activity, earthquakes, or adversely impact soil. The proposed subject site was specifically chosen for the lack of hydrothermal activity discovered during the HSDP. The proposed site is far from any volcanic rift zone of Mauna Loa or Mauna Kea; therefore, no intrusive rocks, alteration, or high temperature fluids are expected to be encountered. Past drilling projects in 1993 and 1997 drilled much deeper than 1,000 feet below sea level in the area and found it is unlikely to have significant elevated temperatures above depths of 6,000 feet. However, temperature measurements will be made during drilling operations to ensure that any significant temperature increases are detected well before they present a threat to drilling operations. If necessary, pressure control equipment will be installed on the wellhead as further means of protection against unanticipated temperatures and pressures in the borehole. If a lava flow were to threaten Hilo, there would be adequate time to seal and cap the hole and remove the drilling rig to a safe location.

The proposed well will need a Well Permit approved by CWRM before any drilling activities commence. This includes the approval of an exploratory and development permit, which will ensure that the well is constructed to meet all State and County rules and regulations during the construction and operation of the well, including applicable seismicity standards. Additionally, the borehole will be encased in concrete to the depth of 1,000 feet below sea level where the freshwater basin is located. This will significantly reduce the risk of damage to the borehole during an earthquake event. Each building associated with the proposed development including the 30,000 square foot beverage bottling plant and 1,360 square foot café will be designed and engineered to withstand seismic hazards according to the Hawai'i County Code, Chapter 5A.

Best Management Practices for construction activities will be strictly followed to prevent adverse impacts to soil. Hawai'i Administrative Rules Chapter 11-55, Appendix C, under Special Conditions for Land Disturbances, describes the following construction management techniques to protect soil:

- a. Clearing and grubbing shall be held to the minimum necessary for grading and equipment operation.
- b. Construction shall be sequenced to minimize the exposure time of the cleared surface area.
- c. Construction shall be staged or phased for large projects. Areas of one phase shall be stabilized before another phase is initiated. Stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff.
- d. Erosion and sediment control measures shall be in place and functional before earth moving operations begin. These measures shall be properly constructed and maintained throughout the construction period.
- e. All control measures shall be checked and repaired as necessary, for example, weekly in dry periods and within twenty-four hours after any rainfall of 0.5 inches or greater within a 24-hour period. During prolonged rainfall, daily checking is necessary. Record of checks and repairs must be maintained.
- f. Records of the duration and estimated volume of storm water discharge must be maintained.
- g. A specific individual shall be designated to be responsible for erosion and sediment controls on the project site.

Please review the Storm Water Pollution Prevention Plan in **Appendix B** for more details on Best Management Practices that will be implemented for construction activities.

### 3.1.2 Hydrologic Resources

The hydrologic cycle is defined as "the constant movement of water between the ocean, the atmosphere, and the Earth" (CWRM, 2019a). There are four main components to the hydrologic cycle: recharge (R), precipitation (P), runoff (RO), and evapotranspiration (ET).

Hydrology of the Hawaiian Islands is largely influenced by trade winds. According to the National Ocean Service (NOS) (2021), trade winds are formed by the Coriolis Effect at the equator. The Coriolis Effect is the slanting of air from the earth's rotation between 30 degrees north and south of the equator. This effect, in combination with high pressure, causes the trade winds to move from east to west on both sides of the equator. In the Northern Hemisphere they're called the Northeast Trade Winds.

The Northeast Trade Winds blow consistently to the east side of Hawai'i Island from the northeast or east northeast. When these trade winds move over warm tropical waters, they pick up moisture. As the winds move inland, they encounter the mountainous slopes of Mauna Loa and Mauna Kea, which forces the air to rise from warm, high-pressure areas, to cool, low-pressure areas. This process is called Orographic Lifting. Since cloud formation leading to precipitation is associated with air being cooled, Orographic Lifting will subsequently produce clouds, which then leads to rainfall. The Northeast Trade Winds account for about 70 percent of all winds, which is a significant contributing factor to the high levels of rainfall in Hilo (Giambelluca et al., 2013).

The maximum rainfall zone on Hawai'i Island is found at mid-slope elevations, roughly 7,000 feet above sea level. Rainfall above this elevation drastically declines due to a process known as Trade Wind Inversion (TWI). Trade Wind Inversion is a warm layer of air, which sits on top of cooler air below it. Warm air above cool air is the inverse to the Orographic Lifting effect, which impedes on rising air and prevents it from continuing up the mountain slope. Air no longer rises at this elevation but is redirected around the mountain instead. This has the effect of capping the clouds at the bottom of the TWI layer, or below 7,000 feet. As a result, the areas above 7,000 feet are quite dry. In fact, the summit of Mauna Kea has the lowest annual total rainfall of all high slopes in Hawai'i at approximately 8 inches a year (Giambelluca, et al., 2013). **Figure 24** below shows a diagram of Orographic Lifting, cloud formation and Trade Wind Inversion.



Figure 24: Diagram of Rainfall Formation over the Hawaiian Islands (Giambelluca, et al., 2013)

### Environmental Setting: Ground Water Resources

Water travels into the earth through a process called percolation. As rainfall wets the land surface, shallow infiltration saturates the uppermost soil layer. Excess water then percolates downward to recharge ground water bodies. Hawai'i Island has a vast and complex subterranean network of geological structures through which water percolates before reaching ground water aquifers (BWS, 2022). The State of Hawai'i defines ground water as "any water found beneath the surface of the earth, whether in perched supply, dike-confined, flowing, or percolating in underground channels or streams, under artesian pressure or not, or otherwise" (CWRM, 2019a).

An aquifer is defined as a subsurface geological formation that is saturated and stores and/or transmits water. There are six (6) different types of aquifers that ground water is stored in within the Hawaiian Islands. These include basal, dike impounded, perched, caprock, brackish, and deep confined. Basal, dike-impounded, and deep confined aquifers are the three known geological structures that are relevant to the proposed project.

Basal aquifers usually occur near the shoreline in dike-free volcanic rocks and sedimentary deposits (**Figure 25**). They can either be unconfined or confined. Unconfined aquifers occur where the upper surface of the saturated aquifer is the water table itself. Confined aquifers are overlain by low permeable or impermeable boundaries that cause the ground water underneath to be pressurized. Basal aquifers are the primary source of municipal water in Hawai'i (CWRM, 2019a).



Figure 25: Hydrological Features of a Typical Basal Aquifer in Hawai'i

Dike-Impounded water or "high-level water" occurs within low permeable magma intrusions, which usually exist within rift zones or calderas. Dike structures are vertical slabs of rock, which can cut across multiple lava flows for considerable distances. They are generally a few feet thick (CWRM, 2019a).

Deep Confined Aquifers have recently been discovered on Hawai'i Island in the Hilo and Keauhou Aquifer System Areas. In these cases, confined ground water was found under artesian pressure beneath an impermeable layer of rock. According to the Hawai'i Water Resource Protection Plan, "Recent discoveries of deep freshwater aquifers on the Big Island are modifying the conceptual models of ground water. These may be related to dike water impounded geology. Also, additional discoveries of very high-level water on the Big Island may also modify the current conceptual models for ground water" (CWRM, 2019a).

Before the mid 1990's our understanding of ground water resources on Hawai'i Island were relatively simple, and largely based on the Stearns model established in the 1930's. This model depicted rainfall infiltration into permeable flank lavas, which trickled down to a basal freshwater lens, which then migrated rapidly to discharge into the ocean. Below the freshwater

lens were salt water saturated rocks. This model also depicted a dike system below Mauna Kea's summit, made up of thousands of magma intrusions. It was believed this system could hold high elevation water, which eventually leaked into the basal freshwater lens (Thomas, 2019) (**Figure 26**).



Figure 26: Hydrological Cycle of the Hawaiian Islands

The dike system below Mauna Kea can be explained through typical shield volcanics. Mauna Kea is made up of a portion of shield volcanics, which is overlain by several post shield volcanics, including Hāmākua and Laupāhoehoe deposits (**Figure 27**). Shield volcanics are made up of very permeable lavas, whereas post shield volcanics are more viscous and are therefore less permeable. The dike complex is thought to be present within the shield portion of Mauna Kea, which allows the infiltration of rainfall. There is evidence that the dike system has the capacity to contain rainfall for an extended period and can drastically slow its transport toward sea level and ground water aquifers (Thomas, 2019).

The Commission on Water Resource Management acknowledges nine (9) "Aquifer Sector Areas" on the Island of Hawai'i, which are further subdivided into "Aquifer System Areas". The Aquifer System Areas are based on near-surface basal aquifers that are frequently recharged by low elevation rainfall. These basal aquifers are commonly used as County drinking water sources. The Aquifer System Areas are separated by the surface contact of historic lava flows and were created from a simplistic understanding of ground water resources/recharge that was adopted decades ago but has recently been debunked.

#### GEOCHRONOLOGY



Figure 27: Geochronology of Mauna Kea, Shield and Post Shield Volcanics

Evidence that our understanding of ground water resources was incomplete first came from the Hawai'i Scientific Drilling Project (HSDP). HSDP was a three-part research initiative with a purpose to investigate the eruptive and growth history of Mauna Kea. The first drilling effort occurred in 1993 and involved coring a pilot hole to a depth of roughly 3,450 feet below sea level. This pilot hole is referred to as Hawai'i Scientific Drilling Project 1 (HSDP1), or better known as Kahi Puka 1 (KP-1). The second deep drilling project, referred to as HSDP2 began in 1999 and occurred in two phases. In the first phase, a hole was core drilled to a depth of over 10,000 feet below sea level. The second phase occurred between 2004 and 2007, when a final depth of 11,500 feet below sea level was reached. HSDP2 remains one of the deepest holes ever drilled into an ocean island volcanic system (Thomas, 2019).

The HSDP expected to find similar results to the Stearns model, which suggested the borehole would drill through a basal freshwater lens and then into saltwater saturated rocks for the remaining depth. Initially, the borehole passed through typical subaerial lavas (lavas laid above sea level) made up of a mixture of very permeable pāhoehoe and 'ā'a flows, and then from fresh to saltwater saturated rock at shallow depths. However, at a depth of just over 900 feet, less permeable layers of ash and clay were uncovered. These were identified as Mauna Kea flow deposits, which had been overlain by younger Mauna Loa flows (Thomas, 2019).

Below this impermeable layer, a deep confined freshwater aquifer was encountered at approximately 1,000 feet below sea level. The aquifer is roughly 400 feet thick and has significant artesian pressure, producing a well flow rate of roughly 2,100 gallons per minute (gpm). Although the well flow rate value indicates characteristics of an underground river system, it is not a direct reflection of the rate the aquifer is flowing and discharging. This will be discussed further below.

Thomas, Paillet & Conrad summarize the characteristics of the deep confined subject aquifer in a 1996 article describing the geochemistry and regional flow patterns found during the HSDP:

"A deeply buried freshwater aquifer is supplied by high elevation recharge trapped beneath an aquiclude formed by the soil horizon marking the interface between Mauna Kea and overlying Mauna Loa basalts. Water moving through this system is discharged in deep submarine springs in the Puna Canyon and estimates of fluid transport rates suggest that this process has the potential to account for a significant volume of high elevation recharge to Mauna Kea."

Coincidently, in the 1970's, deep submersible studies conducted off the eastern flank of the island within Hilo Bay, identified freshwater springs at 1,000 feet below sea level. These studies confirm that the deep confined aquifer is an actively flowing system that is discharging into the ocean at depth.

Scientific evidence suggests that the impermeable layer capping the deep confined aquifer (made up of ash and clay) was deposited subaerially, or above sea level, by a young Mauna Kea lava flow. Eventually, subsequent lava flows from Mauna Loa and island subsidence over time, moved the impermeable layer and freshwater aquifer down to 1,000 feet below sea level. The deep confined aquifer is therefore technically part of the Mauna Kea Aquifer System, which further supports evidence that the subject aquifer is being recharged within Mauna Kea. **Figure 28** below is a conceptual model created by the HSDP incorporating the newly discovered deep confined structure of ground water systems.

After the discovery of the deep confined subject aquifer, the HSDP tested the isotopes of the freshwater to determine the water's age and source elevation at which the rainfall originated on the slopes of Mauna Kea. To understand this, the principal isotopes of water must be looked at. These include Oxygen <sup>18</sup>O/<sup>16</sup>O and Hydrogen <sup>2</sup>H/<sup>1</sup>H. Delta Oxygen 18 ( $\delta^{18}$ O) looks at how much the Oxygen 18 ( $^{18}$ O) content of water differs from ocean water. Ocean water is considered the "reference water" because it has a value of zero (0) Delta Oxygen 18 ( $\delta^{18}$ O). When water is evaporated from the ocean, it loses its heavy oxygen isotope content by up to 13 percent (water vapor in clouds above the ocean have a  $\delta^{18}$ O value of -13%). However, as clouds move inland, water vapor condenses and becomes more enriched in <sup>18</sup>O. Rainfall over the shoreline has an increased value of  $\delta^{18}$ O compared to water vapor in clouds over the ocean by up to 10 percent. The isotopic composition of water vapor continues to change as it moves up slope in elevation. When rain lands on the earth's surface, it maintains its isotopic composition as it percolates into ground water resources. Isotopes of water in aquifers therefore become a way to trace ground water back to its source elevation (Thomas, 2018). **Figure 29 and 30** depicts a figure and graph of the isotopic composition changes of water from ocean to mountain slopes.

# **Conceptual Mauna Kea Ground Water Model**





Figure 29: Isotopic Composition Changes of the Hydrological Cycle (Thomas, 2018)



Figure 30: Graph of Isotopic Composition Changes of Water with Elevation (subject aquifer value depicted in the blue square) (Thomas, 2018)

The isotopes measured within the deep confined subject aquifer indicate that the rainfall originated from the mid-elevation slopes of Mauna Kea and is thousands of years old. According to Thomas, Paillet, & Conrad (1996), "Light stable isotope data indicate that the fresh water at 1,000 feet [below sea level] is derived from recharge entering the island at an average elevation of 6,500 feet [above sea level]. Inferred Carbon 14 (<sup>14</sup>C) activities of the dissolved bicarbonate in the freshwater zone indicate an average calibrated age of 2,200 years B.P. (before present) and an average velocity of at least 14 meters/year (45 feet/year)."

According to Dr. Donald Thomas, a principal geochemist of the Hawai'i Scientific Drilling Project, the age determination of 2,200 years B.P., can be interpreted as the length of time the water took to get from the soil/root zone at an average elevation of 6,500 feet above sea level down to the subject aquifer located 1,000 feet below sea level. Therefore, if recharge at this midelevation region of Mauna Kea were to stop today, the last water to enter the soil/root zone would take at least 2,000 years to pass through the system.

Evidence suggests that the rainfall of the deep confined subject aquifer likely originated on the southeast slope of Mauna Kea near and slightly above Saddle Road. **Figure 31** shows a topographic map of Mauna Kea. The contour lines between roughly 1,900 and 2,100 meters (6,200 to 6,800 feet) on the southeast slope is the potential rainfall recharge area.

**Figure 32** shows the Rainfall Atlas map of this area of Mauna Kea, which receives an average of 40 inches of rain per year. In comparison, **Figure 33** shows the Rainfall Atlas map of the entire Island of Hawai'i.

## **Topographic Map of Mauna Kea**



## Figure 31

### **Rainfall Atlas Map of Mauna Kea**





Figure 32

### **Rainfall Atlas Map of Hawai'i Island**



Another very unexpected discovery of freshwater was made during the HSDP2 drilling at 10,000 feet below sea level within pillow lavas. Geochemists on the project concluded that for water to be present at these vast depths, there would have to be high levels of water under pressure above sea level, within the dike system of Mauna Kea. This is because high amounts of pressure are required to displace sea water that would otherwise infiltrate these pillow lavas at depth. **Figure 34** shows a diagram of this concept.



Figure 34: Conceptual Diagram of Water Bearing Pillow Lavas Recharge from Mid-Elevations

To test this theory, the University of Hawai'i launched the Humu'ula Ground water Research Project (HGRP), which aimed to research the ground water resources in the Saddle region between Mauna Loa and Mauna Kea. Before this project, very little information was known about this area. Prior models predicted the stable water table to be between 5,000 to 6,000 feet below the Saddle Road region.

The HGRP successfully drilled two test holes within Pōhakuloa Training Area (PTA) beginning at roughly 6,000 feet in elevation. The first test hole called PTA-2 was located on the southern end of the PTA cantonment. According to the Hawai'i Ground water & Geothermal Resource Center (HGGRC), the following was found from PTA-2 drilling efforts:

- At 700 feet below the ground surface was the initial stable saturated zone.
- 700 feet to 830 feet a perching layer of clay-rich ash was encountered, and water levels began to drop.
- 830 feet to 1,800 feet was dry rock.
- 1,800 feet was a second saturated interval.
- 1,800 feet to 5,780 feet water levels in the borehole remained stable. It is thought that this deeper water is likely the regional water table for this area.

The findings indicate that ground water occurs at much shallower depths than previously thought, and that a dike-impounded aquifer system is present.

The second test hole was drilled roughly 6 miles west of the PTA-2 borehole. In contrast to PTA-2, this borehole encountered a sequence of confined and pressurized aquifers beginning at 980 feet below the ground surface. According to HGGRC (2018), "Layers of soil, ash, or explosive eruptive deposits confined these aquifers as highly pressurized water trapped between impermeable layers. As we drilled into the aquifers, water came spouting from the point of entry to up the drill string from several hundred to several thousand feet."

The HGRP successfully proved that aquifer systems exist between 6,000 feet above sea level and roughly 1,200 feet below sea level, where the deep confined subject aquifer is discharging. Another way to describe this concept would be as a virtual pipeline from mid-elevation on Mauna Kea down to submarine discharge in Hilo Bay. This means that the subject aquifer is continuously being recharged by extensive aquifer systems located at higher elevations above it and that the water is not confined there; it is constantly flowing in the ocean at depth.

### Impacts and Mitigating Measures

There are three (3) potential impacts to ground water aquifer systems from the proposed deep water well:

- 1. Contamination of a fresh ground water source
- 2. Depletion of Sustainable Yield or excessive drawdown
- 3. Impacts to estuarine habitats due to water loss and surface contamination

This section will solely cover potential contamination risk. Sustainable yield and estuarine habitats will be discussed in the following sections.

Contamination of a fresh ground water source can be divided into five (5) main areas of concern regarding the proposed action:

- 1. Potentially hazardous materials used during the drilling process
- 2. Leakage of water from the deep confined aquifer into the above basal aquifer
- 3. Saltwater upconing
- 4. Wastewater contamination
- 5. Storm water runoff
- 6. Surface contaminants originating in the mid-elevation rainfall recharge area

A Well Permit must be approved by CWRM before any drilling activities occur. The Well Permit will outline specific mitigating measures to a) prevent contamination from materials used during drilling processes, b) reduce the potential of leakage from the deep confined aquifer into the above basal aquifer, and c) prevent saltwater upconing, which occurs when a ground water well pulling from a freshwater zone causes saltwater to move upwards towards the well.

No hazardous materials will be used to drill the proposed well that have the potential to contaminate any surface or ground water resource.

Once the borehole is drilled, it will be encased in concrete to prevent water from the deep confined aquifer entering the above unconfined basal aquifer. The well is proposed to reach a depth of 1,050 feet, which is substantially within the top half of the freshwater zone of the deep confined aquifer. This will inherently lower the risk of saltwater upconing. Saltwater upconing occurs when pumping of ground water from the freshwater zone of an aquifer causes saltwater below it to move upwards towards the well. This can occur from changes in water pressure during pumping activities, which creates a vacuum effect that draws in saltwater from deeper levels and results in saltwater mixing with freshwater. Pump tests will be done in collaboration with CWRM during the Well Permit process to ensure that pump rates to do not result in saltwater upconing or excessive drawdown of ground water resources.

During the pump tests, the ground water produced will be discharged into an onsite disposal sump excavated for that purpose. The pump test will help to confirm the quality and quantity of water which may be available at the site. The disposal sump will be designed to contain the pump test water and allow it to percolate into the subsurface. The BMPs that the contractor will implement during design and construction of the drainage sump will minimize the potential for sediment entrainment or contamination of these discharges and storm water runoff. The SWPPP found in **Appendix B** details additional BMPs that will be implemented during construction phases. BMPs specific to well construction will be outlined in the Well Permit.

An Environmental Site Assessment found no evidence of current or past contamination on the site that has the potential to leak into ground water sources during construction. Best Management Practices will be implemented before the Well Permit is approved to prevent any storm water or sediment from entering the well during exploratory and construction drilling. The risk of surface contaminants entering any ground water source during operation is low, arguably negligible since the well will be under significant artesian pressure. A documented well flow rate of 2,100 gallons per minute was witnessed by the HSDP. A well under this kind of pressure will naturally prevent the ability of surface contaminants to travel down the well into the aquifers below.

The Property will be connected to the county sewer line to handle wastewater. Construction Best Management Practices and mitigating measures to prevent storm water runoff are outlined in detail in Sections 3.1.1 and 3.1.4. The proposed well will be monitored 24 hours a day, seven days a week, and designed for rapid capping in the event of a tsunami, which will be outlined in the Well Permit, requiring CWRM and DOH approval.

In the event the initial pilot hole is drilled, and the water is not under significant artesian pressure, a pump will be installed following the approval of a Pump Installation Permit from

CWRM. However, this is not expected to be a likely situation. In fact, Dr. Donald Thomas suspects the artesian pressure may be greater on the subject site than what was experienced during the HSDP. This is because the subject Property is located closer to Mauna Kea compared to the HSDP, which could increase static head pressure.

Wastewater from the proposed action does not pose a risk to any ground water resource. The subject site will be connected to the County sewer line and the project will incorporate wastewater management practices. Efforts to minimize wastewater are reflected in the design of the proposed project, including the use of water from the deep confined aquifer, which will be treated using nanofiltration and UV light disinfection. Water from the proposed deep well will require less treatment and will therefore produce less wastewater compared to water from the county aquifer. Compressed air will be used to "rinse" bottles before they are filled to minimize water use and wastewater as well. Best Management Practices will be strictly followed during construction activities to manage storm water runoff. These are detailed in Section 3.1.4 below.

Any potential contaminants entering the 'virtual pipeline' system of aquifers below Saddle Road have a low risk of impacting the subject aquifer at 1,000 feet below sea level. The rainfall recharge area of the deep confined aquifer at an average elevation of 6,500 feet above sea level is predominantly comprised of shrub and forest lands. No large-scale commercial agricultural operations, which may use significant quantities of pesticides and herbicides, are present in this area. However, in the event surface contaminants are present in the recharge area, the estimated percolation rate of 45 feet per year over 2,200 years significantly reduces the potential for contaminants to reach the deep confined subject aquifer. This is because of natural breakdown processes by geological structures during percolation (Thomas, personal communication, July 13, 2022).

It is also important to note that during early consultation, the Sierra Club brought forward a 2018 letter written by the Office of Planning and Sustainable Development (OSPD) stating that the subject aquifer was "currently used as a drinking water source, is fresh, irreplaceable, and is highly vulnerable to contamination." This exact quote was found in Mink and Lau (1990) referring to the Hilo Aquifer System Area (80401). The Hilo Aquifer System Area is an unconfined basal aquifer that is indeed subject to possible contamination from surface activities. This is not the case for the subject aquifer that is confined below the Hilo Aquifer, separated by a 100-foot-thick barrier of impermeable soil. Furthermore, Donald Thomas confirmed that the deep confined subject aquifer has only been accessed for research purposes twice historically and is not currently used as a drinking water source.

### Environmental Setting: Climate and Climate Change

Climate in the subject area is warm and moist, with an average annual rainfall of 130 inches and a mean annual temperature of 75 degrees Fahrenheit (Giambelluca et al., 2013).

The Hawai'i Revised Statues §226-109 and Hawai'i Administrative Rules §11-200.1 strongly encourages the environmental review process to analyze the impacts a proposed action may have on climate change. This includes identifying short and long-term effects, levels of resilience, and mitigation measures including potentially beneficial alternatives.

The United Nations Intergovernmental Panel on Climate Change (IPCC) defines climate change as "a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or variability of its properties, and that persists for an extended period, typically decades or longer" (IPCC, 2007).

Climate change is a fundamental environmental issue that is particularly complex and far reaching. The National Aeronautics and Space Administration (NASA) measured carbon dioxide levels in the atmosphere before the industrial revolution began in the late 1700s. Approximately 280 parts per million (ppm) was present in the atmosphere. In 2013 carbon dioxide levels surpassed 400 ppm for the first time in recorded history (Tetra Tech, 2020). According to the IPCC, "Human influence on the climate system is clear, and recent anthropogenic emissions of green- house gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems" (IPCC, 2014). Globally, results of climate change may alter precipitation patterns, melt snow cover, and ice sheets, increase ocean acidification, and raise sea levels. **Figure 35** is a graph of historical carbon dioxide levels in the atmosphere compared to current levels.



Figure 35: Historical Carbon Dioxide Levels in the Atmosphere in Parts Per Million

According to the Hawai'i County Hazard Mitigation Plan (2020), air temperatures have increased by an average of 0.3 degrees Fahrenheit (°F) per decade in Hawai'i. This is close to the global average rate of 0.36 °F per decade. However, temperature rise can be further broken down by elevation in Hawai'i. At elevations below 2,600 feet, temperatures have increased by 0.16 °F per decade, whereas elevations above 2,600 feet have increased by 0.48 °F per decade. This means higher elevation areas in Hawai'i are getting warmer at a faster rate than the global average.

The University of Hawai'i's 2014 climate report suggests climate change will impact five (5) primary areas: marine ecosystems, including open ocean and coral reefs/near-shore habitats,

coasts and the built environment, terrestrial ecosystems, freshwater resources, and public health (Tetra Tech, 2020). In the Hawaiian Islands, climate change is expected to impact our water resources through a decrease in prevailing Northeasterly Trade Winds, decline in rainfall, increased flooding and drought, reduced recharge to ground water aquifers in leeward areas, elevation of basal aquifers due to sea level rise, and higher water use" (CWRM, 2019) (**Figure 36**).

The Hawai'i County Hazard Mitigation Plan notes that rainfall throughout the state has steadily declined by 15 percent over the past 20 years. A decline in rainfall may lead to more drought conditions and heavy rain events. It also states, "In addition, the decrease in rainfall levels has also led to a decline in stream base flow over the last 70 years, influencing aquatic and riparian ecosystems, local agriculture, and aquifer recharge and freshwater supplies" (Tetra Tech, 2020).



Figure 36: Indicators of Climate Change in the Pacific Islands (CWRM, 2019)

According to the U.S. Drought Monitor (USDM), Hawai'i has "frequently experienced severe drought conditions somewhere in the State since June 2008" (CWRM, 2019). In 2012, the Pacific Islands Regional Climate Assessment (PIRCA) confirmed that Hawai'i has seen a steep negative decline in rainfall since 1980, which has led to a decrease in ground water storage. "Research projections of future rainfall in the Hawaiian Islands suggest that Hawai'i should be prepared for a future with warmer climate, diminishing rainfall, and declining stream base flows" (CWRM, 2019).

According to a report by the National Weather Service, the month of August 2022 saw rainfall totals below average at most rain gauges on the Island of Hawai'i, with many at less than 50 percent their average. Waiākea Uka had one of the lowest total rainfalls for August, receiving 25 percent of its normal average (Kodama, 2022).

The U.S. Drought Monitor shows the location and intensity of drought across the United States. It ranges from abnormally dry (D0) to exceptional drought (D4). **Figure 37** below shows the drought conditions on the Island of Hawai'i as of the end of August 2022. Most of Hawai'i County is in moderate drought conditions (D1) and the Mauna Kea Forest Reserve under severe drought conditions (D2). Under D1 conditions an area may experience some damage to crops and pastures and some water shortages develop. Under D2 conditions crop or pasture loss is likely and water shortages are common.



Figure 37: Drought Severity Map of the Island of Hawai'i

The El Niño-Southern Oscillation (ENSO) cycle also has the potential to amplify drought conditions. El Niño and La Niña are fluctuations in ocean and atmospheric temperatures in the Pacific, which can have large-sale impacts on global weather and climate (Tetra Tech, 2020). According to the HCHMP, "records show that there is an approximately 70 percent chance of drought in Hawai'i during the wet season following an El Niño event." For example, in January 1998 only 0.14 inches of rain was recorded in Hilo, which was the lowest monthly total ever observed since records have been kept. As noted earlier, the climate and rainfall of the Hawaiian

Islands is directly influenced by the northeasterly trade winds, which have decreased steadily in the last 40 years (Tetra Tech, 2020).

### Impacts and Mitigating Measures

The proposed action will not produce significant greenhouse gas emissions. The café is expected to generate minimal vehicle trips per day, including drive-through customers. Idle emissions are not anticipated to produce adverse impacts due to the low number of anticipated trips and nature of products offered (i.e., coffee, tea, water, and pre-made food items). Approximately two (2) to four (4) truck trips are expected daily. Trucks will be utilized to pick up and deliver local coffee beans and fresh produce. Bottled water and coffee products will be delivered by truck to the Hilo port and across the Island of Hawai'i. Two (2) to four (4) daily truck trips will not contribute to a significant increase in GHG emissions.

Ships will be utilized to deliver products to other Hawaiian Islands, the U.S. mainland, and international markets. The average number of shipments per week is not yet known. The estimated number of bottled beverages to be sold in non-local markets will need to be further refined to fully assess potential impacts to GHG emissions. However, potential shipments are not expected to be substantial due to the proposed maximum daily withdrawal rate of 200,000 gallons of water per day. Weekly shipments are therefore likely to be reasonable and thus are not expected to contribute to a significant increase in GHG emissions.

Exhaust from coffee roasting activities will follow all County and State regulations, including the use of ventilation systems according to Chapter 11-48 of the Hawai'i Administrative Rules. All exhaust will be pumped vertically into the air to avoid settling in low lying areas.

The proposed action will also not use an excessive amount of energy. Electricity will be sourced from HELCO and solar panels to maximize the use of renewable resources available at the subject site. Potential impacts of reduced rainfall because of climate change will be discussed in the following section.

### Environmental Setting: Sustainable Yield of Ground Water Resources

The Commission on Water Resource Management recognizes nine (9) Aquifer Sector Areas and the twenty-four (24) Aquifer System Areas on Hawai'i Island. Each Aquifer System Area has an established Sustainable Yield (SY) defined by Million Gallons Per Day (MGD). Hawai'i Revised Statues §174C-3 defines Sustainable Yield as "the maximum rate at which water may be withdrawn from a water source without impairing the utility or quality of the water source as determined by CWRM."

Sustainable Yield is a critical guide for water management of ground water aquifers to determine whether regulatory controls are working or whether additional regulation is needed. According to the 2019 WRPP update:

"The availability of ground water resources is dependent upon recharge, or the replenishment of fresh ground water, and ground, and surface water interactions. However, ground water flow can be difficult to understand and predict because scientists must infer and interpolate its status and characteristics from limited data and modeling tools. The amount of ground water that can be developed in any aquifer is limited by the amount of natural recharge and aquifer outflow that must be maintained to prevent seawater intrusion, to maintain perennial streamflow, and to sustain the ecosystems dependent upon ground water discharge. CWRM first adopted Sustainable Yield estimates in the WRPP in 1990 and has revised them based on management approaches, new information and modeling techniques, and the identification of errors in previous models or studies."

For most aquifers, CWRM uses a "Robust Analytical Model" (RAM) to determine Sustainable Yield estimates. RAM is based on accepted hydraulic principles involving recharge, original head, and equilibrium head. RAM generally limits water use to half the recharge for most basal aquifers, which allows the rest to discharge at the coast (CWRM, 2019a). According to CWRM (2019a), "RAM was developed for unconfined basal aquifers and assumes a sharp interface between freshwater and saltwater, homogeneous and isotropic aquifer conditions, and uniform, laminar ground water flow."

The Hilo (80201) and Onomea (80204) Aquifers are basal aquifers that are recharged directly from low elevation surface rainfall in areas that receive between 130 and 140 inches of rain per year. The rainfall recharge of these aquifers is therefore substantial and frequent. The Hilo and Onomea Aquifers have the highest Sustainable Yields on the Island of Hawai'i, at 349 MGD and 147 MGD, respectively (**Figure 38**).

The boundary between the Hilo and Onomea Aquifers is the surface contact of Mauna Loa and Mauna Kea lava flows. Looking at **Figure 38**, it appears on the surface, that the subject Property lies within the Hilo Aquifer System Area. However, since the proposed well would withdraw from below Mauna Kea lavas at depth, CWRM may consider the subject aquifer to be a part of the Onomea Aquifer System Area. At this time, CWRM has not implemented a regulatory framework that considers the possibility of multiple deep aquifers that could come from separate watersheds. Therefore, CWRM will examine the drilling log and lithology during exploratory drilling operations to determine how to regulate the deep confined aquifer.

# For the public's purposes, the deep confined aquifer should be considered a separate aquifer system from the Hilo and Onomea basal aquifers despite it not being officially recognized as such by the Commission on Water Resource Management.

The deep confined subject aquifer differs from the Hilo and Onomea Aquifers (acknowledged by CWRM) for three (3) main reasons:

- 1. It is recharged by mid-elevation rainfall located at an average elevation of 6,500 feet above sea level on the southeast slope of Mauna Kea.
- 2. It is confined 1,000 feet below sea level by a 100-foot-thick impermeable layer of soil and ash, which separates it from above basal aquifers.
- 3. It does not have an established Sustainable Yield.

It remains difficult to predict the SY of the subject aquifer due to a lack of data on the rate of recharge, flow, and discharge rates. However, Thomas, Paillet & Conrad (1996) make an "order-of-magnitude" estimate of recharge based on basic principles and findings of the KP-1 drill site:

### Aquifer Sector and System Areas of Hawai'i Island



"The significance of the deep freshwater flow to the overall ground water budget of windward Mauna Kea can be crudely assessed using a simple box model: the resistivity data indicate a freshwater aquifer of about 200 meter thickness; the flow velocity is indicated to be about 14 meters/year (45 feet/year) or 0.04 meters/day (0.12 feet/day); and although the lateral extent of the discharge zone is not known, we consider only the 10-km width of submarine Mauna Kea flank exposed in the Puna Canyon. Using these approximations, we calculate a discharge of about  $80,000 \text{ m}^3/\text{day}$  (m<sup>3</sup> = cubic meters) (21.1 million gallons per day) of freshwater from the deep aquifer. A recharge area located radially upslope of the discharge area, arbitrarily set at 10 km<sup>2</sup> (4 square miles) and centered at an elevation of 2000 meters (6,500 feet) on the flank of Mauna Kea, receives about  $0.5 \ge 10^6 \text{ m}^3/\text{day}$  (500,000 cubic meters/day) of rainfall (Figure 39). When corrected for evapotranspiration, this rainfall is equivalent to a net recharge of ~0.10 X  $10^6 \text{ m}^3/\text{d}$  (100,000 cubic meters/da or 26.4 million gallons per day). Although these numbers provide only an order-of-magnitude estimate of recharge available for the deep freshwater aquifer, the results suggest that the volume of water moving through this system may account for a significant portion of the high elevation recharge to the southeast slope of Mauna Kea."

Thomas, Paillet, & Conrad (1996) conclude that, "The results of our preliminary study of the ground water system below the KP-1 drill site demonstrate that intervolcano and interflow aquicludes can have a substantial impact on water circulation and discharge from young island volcanoes."



Map of Hawaii island showing surface contour and offshore bathymetry around drill site. (a) Shaded square shows  $10 \times 10 \text{ km}^2$  used in estimate of recharge; shaded arrow shows inferred trajectory of groundwater flow used in estimate of deep water flow rates; dashed line E-F-G shows area of cutaway in Figure 5. (b) Open arrow indicates inferred depth of seawater inflow into submarine flank of Mauna Kea; solid arrows indicate probable depth of discharge of submarine freshwater springs. (c) Location of Figure 1A on island of Hawaii.

Figure 39: Topographic Map of Area and Direction of Recharge from Mauna Kea to the Subject Aquifer

#### Impacts and Mitigating Measures

CWRM's current regulatory framework does not recognize the deep confined subject aquifer as an Aquifer System Area. As previously stated, CWRM will examine the drilling log and lithology to determine how to regulate the deep confined aquifer. If CWRM determines that the subject aquifer withdraws from the Onomea Aquifer System area, we must look at its Sustainable Yield of 147 MGD. Current foreseeable use of ground water from this aquifer system is less than five (5) MGD. The projected draw of 200,000 gallons per day (0.20 MGD) would represent less than 0.2 percent of the SY of the Onomea Aquifer. In contrast, if the Sustainable Yield of the Hilo Aquifer (349 MGD) is applied, then a projected draw of 200,000 gallons per day would represent less than 0.06 percent of the SY.

According to the Water Resource Protection Plan 2019 update, the existing demands of the Hilo and Onomea Aquifer System Areas as of 2016 accounted for 0.2 percent and 12.7 percent of their respective Sustainable Yields (**Figure 40**).

However, implementing the SY of the Hilo or Onomea Aquifer Systems is not entirely appropriate, as there is scientific evidence to suggest these aquifers and the deep confined subject aquifer are entirely different systems.

The Hilo and Onomea Aquifers are recharged by low elevation rainfall that infiltrates the aquifer systems directly from the surface. These systems are separated from the deep confined subject aquifer by a 100-foot-thick impermeable layer of soil between 900 and 1,000 feet below sea level. We must therefore use the scientific data collected during the HSDP to best estimate the potential SY of the deep confined subject aquifer to assess potential impacts.

The potential rainfall recharge rate of 26.4 MGD outlined by Thomas, Paillet, and Conrad (1996) is based on rainfall data that was available in 1996. It is likely this rate has changed since rainfall has declined in Hawai'i over the last 20 years, especially at higher elevations. However, according to Dr. Donald Thomas, if rainfall within the recharge area were to stop today, it would take over 2,200 years for water located within the virtual pipeline to drain into the deep confined subject aquifer. This provides evidence that the potential rainfall recharge has a certain longevity within the pipeline system despite potential changes to rainfall patterns due to climate change.

Furthermore, the rainfall recharge estimation of 26.4 MGD is based on an "arbitrary" recharge area set at 4 square miles and centered at 6,500 feet. The actual recharge area is largely unknown and could span a much larger area. For example, Dr. Donald Thomas suggests the recharge area elevation could be anywhere between 6,000 and 7,000 feet above sea level. It is therefore possible that the potential rainfall recharge is higher than the 26.4 MGD estimation, and that the volume of water moving through the system may account for a significant portion of the high elevation recharge to the southeast slope of Mauna Kea.

The submarine discharge area from the deep confined aquifer is also not fully known. However, it is estimated to begin at roughly 1,200 feet below sea level (Thomas, personal communication, August 4, 2022). The estimated discharge rate of 21.1 MGD only considers potential discharge within a 4 square mile range of the submerged submarine flank of Mauna Kea.

(Aquifer Code Number) Aquifer System	Sustainable Yield (SY) (MGD)	Existing Water Use (MGD) 12 MAV	SY minus pumpage (MGD)	Existing Water Use as a Percent of SY
(80101) Hāwī	11	0.60	10.40	5.4%
(80102) Waimanu	110	NRU	NRU	NRU
(80103) Māhukona	10	1.61	8.39	16.1%
(80201) Honokaa	29	0.615	27.385	2.2%
(80202) Pa'auilo	56	0.090	52.910	0.2%
(80203) Hakalau	150	0.159	149.841	0.1%
(80204) Onomea	147	0.312	146.688	0.2%
(80301) Waimea	16	13.83	2.17	86.4%
(80401) Hilo	349	44.26	304.74	12.7%
(80402) Kea'au	395	11.06	383.94	2.8%
(80501) 'Ōla'a	125	NRU	NRU	NRU
(80502) Kapāpala	19	NRU	NRU	NRU
(80503) Naalehu	118	1.05	116.95	0.9%
(80504) Ka Lae	31	NRU	NRU	NRU
(80601) Manukā	25	0.06	24.94	0.2%
(80602) Ka'apuna	51	0.00	51.00	0.0%
(80603) Kealakekua	38	1.96	36.04	5.2%
(80701) 'Anaeho'omalu	30	5.45	24.55	18.2%
(80801) Pahoa	432	0.86	431.14	0.2%
(80802) Kalapana	158	0.06	157.94	0.0%
(80803) Hilina	20	NRU	NRU	NRU
(80804) Keaīwa	17	NRU	NRU	NRU
(80901) Keauhou	38	18.13 <sup>1</sup>	19.87	48%
(80902) Kīholo	18	8.01	9.99	44.5%
HAWAI'I TOTAL	2393	108.12	2284.88	4.5%
HAWAI'I STATE WIDE	3556.5	409.75	3146.75	11.5%

Figure 40

It is possible the actual submerged discharge area is much larger than this estimation. "Estimated ground water flow... at a depth of 1,200 feet, may represent as much as one third (1/3) of the rainfall recharge to the windward mid-level slopes of Mauna Kea" (Stopler, DePaolo, & Thomas, 2009).

These crude assessments show that it is likely the subject aquifer is recharging at a higher rate than it is discharging by at least 5.3 MGD (26.4 MGD rainfall recharge -21.1 MGD discharge). The proposed action to withdraw 200,000 gallons per day is 0.75 percent of the total estimated rainfall recharge potential, and 0.95 percent of the total estimated discharge rate. The proposed action will therefore have negligible impacts to the recharge and discharge potential of the subject aquifer.

Although there is no established Sustainable Yield for the deep confined subject aquifer, it is believed to be substantial based on the recharge potential and experienced flow rate of 2,100 gallons per minute during the HSDP. Dr. Donald Thomas estimates the SY could be anywhere between 10 MGD to 100 MGD depending on the limitations of the crude assessments discussed and how much of the submerged shoreline is actually discharging water. However, if we assume a SY of only 10 MGD, withdrawing 200,000 gallons per day would only be 2 percent of this value. In contrast, if we assume a SY of 100 MGD, withdrawing 200,000 gallons per day would only be 2 percent.

Thus, the proposed action is not expected to cause a significant impact to the estimated SY of the subject aquifer whether the scientific data from HSDP or the SY of the Hilo or Onomea Aquifer System is applied.

### Environmental Setting: Waiākea Fishpond

Waiākea Fishpond is an important estuary for ecosystems. It totals 40-acres and is both spring and stream fed. Since the pond drains into Hilo Bay, it is influenced by the tides. It has a maximum depth of roughly 12 feet. Typical fauna in the pond includes Striped mullet (*Mugil cephalus*), Marquesan mullet (*Valamugil engeli*), Snapper (*Lutjanus fulvus*), Goatfish (*Mulloides vanicolensis*), Hawaiian flagtail (*Kuhlia sandvicensis*), White crab (*Portunus sanguinolentus*) and the Samoan crab (*Scylla serrata*). Up to twenty-five (25) bird species are known to frequent the area including the endangered Hawaiian coot (*Fulica alai*), the Hawaiian duck (*Anas wyvilliana*) and the Hawaiian goose, or Nēnē (*Branta sandvicensis*) (DOH, 2019).

Wailoa River/Waiākea Fishpond/Hilo Bay estuary is considered a Ground water Dependent Ecosystem (GDE) that is supplied by the Hilo Aquifer System Area. According to DLNR Division of Aquatic Resources (DAR), Wailoa River/Waiākea Fishpond and Hilo Bay estuary is "primarily driven by ground water discharge and highly dependent on such to naturally function as estuarine habitat for native species, especially juvenile and adult fishes important to the local non-commercial fishery."

Submarine Ground water Discharge (SGD) is ground water that flows from terrestrial to coastal environments through subterranean pathways. According to Kelly et al., (2018) "submarine ground water discharge impacts nearshore ecosystems and influences nutrient balances, potentially causing eutrophication events, harmful algal blooms, and shifts in the dominant flora

and fauna of coastal waters." SGD has also been seen to have nutrient levels that are more than surface inputs, which can impact coral reefs and other subtropical ecosystems.

According to CWRM, human activities have the capacity to harm GDEs and SGD. "Human activities that alter the acidity, nutrients, temperature, chlorides, and dissolved oxygen of either or both ground and surface water may have significant effect on aquatic environments, particularly where ground and surface water mix, or where there are changes in the natural interaction of ground and surface water" (CWRM, 2019a). In Hawai'i, GDEs support flood control, water supply, water purification, recreation, biodiversity, and traditional and customary rights.

DAR also notes that intermittent anchialine pools that form during high tides have been reported in nearby properties. These pools may support populations of an endemic shrimp, *Halocaridina rubra*, commonly known as 'ōpae 'ula.

#### Impacts and Mitigating Measures

The Wailoa River/Waiākea Fishpond/Hilo Bay estuarine habitats and water levels are supported by ground water discharge from the Hilo Aquifer System Area, which is not connected to the deep confined aquifer. As discussed above, the Hilo Aquifer is recharged directly by low elevation rainfall that infiltrates directly from the surface. The potential discharge area of the Hilo Aquifer into the ocean is between sea level and roughly 900 feet below sea level. At 900 feet below sea level there is a 100-foot-thick impermeable layer that separates the Hilo Aquifer from the deep confined aquifer. The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. No water will be withdrawn from the Hilo Aquifer under the proposed action therefore no impacts are expected to surface water levels, submarine habitats, or the local non-commercial fishery.

Furthermore, CWRM requires pump tests for all new wells with a proposed pumping rate greater than 50 gallons per minute as part of the Well Permit application process. Data from these tests are used to determine the potential for the proposed well to impact nearby streams, marshes, or other surface water bodies (CWRM, 2019). If it is determined that the new well is likely to adversely impact a surface water body, CWRM would take several actions to mitigate impacts. However, this is outcome is not anticipated since the subject aquifer is deep confined and is not known to correlate to any surface water body.

Submarine discharge from the deep confined aquifer at roughly 1,200 feet below sea level is not expected to significantly decrease based on the proposed action. As noted above, the Sustainable Yield could range anywhere from 10 MGD to 100 MGD depending on how much of the submerged shoreline is discharging. If we assume a SY of 10 MGD, withdrawing 200,000 gallons per day would only be 2 percent of this value. In contrast, if we assume a SY of 100 MGD, a draw rate of 200,000 gallons per day would only account for 0.2 percent. In either case the proposed action will have negligible impact to the total discharge rate into the ocean at depth. Potential impacts to water loss, nutrients, and habitats located at depth will therefore not be significantly adverse.

There is no evidence of aquatic resources or intermittent anchialine pools on the subject property. However, reports of such pools have been noted on the adjacent parcel to the west. Since the natural drainage of the property flows to the west, towards Waiākea Fishpond and potential intermittent anchialine ponds, extra mitigating measures must be put in place during construction and operation of the proposed project. The Storm Water Pollution Prevention Plan found in **Appendix B** details specific BMPs to prevent and divert runoff to this area of the site

A Jurisdictional Determination (JD) was requested from the United States Army Corps of Engineers to certify that the subject property is not under their jurisdiction due to its proximity to Waiākea Fishpond, state wetlands, and nearby anchialine ponds. However, their preliminary review of the site deemed a JD unnecessary at this time.

### 3.1.3 Flood Zones and Shoreline Setting

### Environmental Setting: Floodplain and Tsunamis

The subject property is located within the State Civil Defense Agency, Tsunami Evacuation Zone (**Figure 41**). According to the Federal Emergency Management Agency (FEMA), the Flood Insurance Rate Map (FIRM) classifies the Property as Flood Zone X, which is outside of the 500-year floodplain (**Figure 42**). Wailoa River and Waiākea Fishpond are considered principal flooding sources by FEMA. These water bodies are in Flood Zone VE, which is within the 100-year coastal flood range, or 1% chance of occurring in any given year, with velocity hazard (wave action). The subject Property lies slightly east of this special flood hazard area.



Figure 41: Tsunami Evacuation Zone in Relation to the Subject Property

24	1 Minus		
22 Walola Stream	(Section)		
Charles 1	1902F 19	1 /z	ONE AE
SPIOPIO ST			
	and of the second	2	Langer Barner
TONEAR OF A			
Jan Je Jan		12	
A CHOX &			
ZONE * ////			ZONEX
ZONE 2 15	ZONE X		mana Citir
2011- 0904-			
son in	ZONEX		
ZONEVE			
ZONE AE		FILE	
		FLOOD H	AZARD ASSESSMENT TOOL LAYER LEGEND
		(Note:	leaend does not correspond with NEHLI
FIOOD Hazard As	www.hawaiinfip.org	SPECIAL FLOOD HAZ	ARD AREAS (SFHAS) SUBJECT TO INUNDATION BY
Flood Hazard As	www.hawaiinfip.org	SPECIAL FLOOD HAZ THE 1% ANNUAL CH year), also know as t being equaled or exc	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE,
Flood Hazard As	www.hawaiinfip.org	SPECIAL FLOOD HAZ THE 1% ANNUAL CH year), also know as t being equaled or exc AH, AO, V, and VE. <sup>-</sup> elevation of the 1% purchase applies in th	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones:
FIOOD Hazard As Property Information Not COUNTY: HAWAII	www.hawaiinfip.org	SPECIAL FLOOD HAZ THE 1% ANNUAL CH year), also know as t being equaled or exc AH, AO, V, and VE. <sup>-</sup> elevation of the 1% purchase applies in th Zone A: No	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones:
FIOOD Hazard As         Property Information         COUNTY:         HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA	www.hawaiinfip.org	SPECIAL FLOOD HAZ THE 1% ANNUAL CH year), also know as t being equaled or exc AH, AO, V, and VE. <sup>-</sup> elevation of the 1% purchase applies in th Zone A: No Zone AE: E	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED HILO, HI 96720	www.hawaiinfip.org	SPECIAL FLOOD HAZ THE 1% ANNUAL CH year), also know as t being equaled or exc AH, AO, V, and VE. <sup>-</sup> elevation of the 1% purchase applies in th Zone A: No Zone AE: E Sone AH: I BFE determ	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: D BFE determined. SFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       Flood Hazard Information	www.hawaiinfip.org	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: Main         Zone AE: E         BFE determ         Sloping term	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: D BFE determined. BFE determined. BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       Flood Hazard Information         FIRM INDEX DATE:       SEPTER         LISTER OF MAR CHANGE(S):       NONE	MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as the         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: No         Zone AE: E         Zone AH: I         BFE determ         Zone AO:         sloping ter         Zone V: C         no BFE det	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. Elood depths of 1 to 3 feet (usually areas of ponding); mined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. Destal flood zone with velocity hazard (wave action); termined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       Flood Hazard Information         FIRM INDEX DATE:       SEPTEI         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516	MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: No         Zone AE: E         Zone AE: E         Zone AA: No         Zone AA: No         Zone AA: No         Zone AA: Sologing ter         Zone V: C         no BFE detern         Zone V: C         BFE detern	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. BFE determined. BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. bastal flood zone with velocity hazard (wave action); termined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       Flood Hazard Information         FIRM INDEX DATE:       SEPTED         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTED	MBER 29, 2017 MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: No         Zone AE: E         Zone AE: E         Zone AE: E         Zone AE: E         Zone AC: sloping ter         Zone V: C         no BFE deterr         Zone V: C         BFE deterr         Zone V: C         por BFE deterr	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. bastal flood zone with velocity hazard (wave action); rermined. Coastal flood zone with velocity hazard (wave action); nined. Floodway areas in Zone AE. The floodway is the is stream plus any adjacent floodplain areas that must
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       HILO, HI 96720         Flood Hazard Information       SEPTER         FIRM INDEX DATE:       SEPTER         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTER	MBER 29, 2017 MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: No         Zone AE: E         Zone AE: E         Zone AE: E         Zone AE: E         Zone AC: sloping ter         Zone V: C         no BFE deterr         Zone V: C         BFE deterr         Zone V: C         no BFE deterr         Zone V: C         no BFE deterr         Zone V: C         no BFE deterr         Cone V: C         no BFE deterr	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. bastal flood zone with velocity hazard (wave action); rermined. Coastal flood zone with velocity hazard (wave action); nined. : Floodway areas in Zone AE. The floodway is the i stream plus any adjacent floodplain areas that must ree of encroachment so that the 1% annual chance pe carried without increasing the BFE.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       HILO, HI 96720         Flood Hazard Information       SEPTER         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTER         THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES       YES         FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/       YES	MBER 29, 2017 MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: Mage         Zone A: Mage         Zone AE: E         Zone AE: E         Zone AD         Sloping ter         Zone V: C         no BFE deterr         Zone V: C         no BFE deterr         Zone V: C         BFE deterr         Zone V: C         no BFE det         Zone AE: E         Zone V: C         no BFE det         Done AE: E         NON-SPECIAL FLOOD         flood zone. No manc         but coverage is availa	ARD AREAS (SFHAS) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAS include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       HILO, HI 96720         Flood Hazard Information       SEPTER         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTER         THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE:       YES         FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/       NO         FOR MORE INFO, VISIT: http://dinreng.hawaii.gov/dam/       NO	MBER 29, 2017 MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone AR         BFE detern         Zone AR         Zone VP         BFE detern         Zone AR         BFE detern         De kept fi         Rodo can R         NON-SPECIAL FLOOD         Now AR         Image: Source and Source         Image: Source and Source         Source and Source         Source and Source         Image: Source and Source         Image: Source and         Image: Source and <th>ARD AREAS (SFHAS) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. BFE determined. BFE determined. BFE determined. BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. bastal flood zone with velocity hazard (wave action); rermined. Coastal flood zone with velocity hazard (wave action); nined. E Floodway areas in Zone AE. The floodway is the f stream plus any adjacent floodplain areas that must ree of encroachment so that the 1% annual chance be carried without increasing the BFE. HAZARD AREA - An area in a low-to-moderate risk atory flood insurance purchase requirements apply, ble in participating communities. C shaded]: Areas of 0.2% annual chance flood; areas of chance flood with average depths of less than 1 foot trainage areas less than 1 square mile; and areas by levees from 1% annual chance flood.</th>	ARD AREAS (SFHAS) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: b BFE determined. BFE determined. BFE determined. BFE determined. BFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); nined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. bastal flood zone with velocity hazard (wave action); rermined. Coastal flood zone with velocity hazard (wave action); nined. E Floodway areas in Zone AE. The floodway is the f stream plus any adjacent floodplain areas that must ree of encroachment so that the 1% annual chance be carried without increasing the BFE. HAZARD AREA - An area in a low-to-moderate risk atory flood insurance purchase requirements apply, ble in participating communities. C shaded]: Areas of 0.2% annual chance flood; areas of chance flood with average depths of less than 1 foot trainage areas less than 1 square mile; and areas by levees from 1% annual chance flood.
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       HILO, HI 96720         Flood Hazard Information       SEPTER         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTER         THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE:       YES         FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/       NO         THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE:       NO         FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/       NO         FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/       NO	MBER 29, 2017 MBER 29, 2017	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone AR: Na         Zone AR: I         BFE determ         Zone AA: I         BFE determ         Zone V: C         no BFE determ         Zone V: C         no BFE determ         Zone V: C         BFE determ         Zone V: C         no BFE determ         Zone V: C         BFE determ         Zone V: C         no BFE determ         Zone X: Annal or         flood zone. No manc         but coverage is availa         Yannual or with co         protected         Zone X: An         floodplain	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: D BFE determined. SFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); mined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. Dastal flood zone with velocity hazard (wave action); ermined. Elodway areas in Zone AE. The floodway is the is stream plus any adjacent floodplain areas that must ee of encroachment so that the 1% annual chance be carried without increasing the BFE. HAZARD AREA - An area in a low-to-moderate risk altory flood insurance purchase requirements apply, ble in participating communities. (shaded): Areas of 0.2% annual chance flood; areas of chance flood with average depths of less than 1 foot rainage areas less than 1 square mile; and areas by levees from 1% annual chance flood. teas determined to be outside the 0.2% annual chance
FIOOD Hazard As         Property Information       Not         COUNTY:       HAWAII         TMK NO:       (3) 2-2-033:011         WATERSHED:       WAILOA         PARCEL ADDRESS:       ADDRESS NOT DETERMINED         HILO, HI 96720       Flood Hazard Information         FIRM INDEX DATE:       SEPTER         LETTER OF MAP CHANGE(S):       NONE         FEMA FIRM PANEL:       15516         PANEL EFFECTIVE DATE:       SEPTER         THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE:       YES         FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/       NO         FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/       NO         FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/	ASSESSMEIL REPORT www.hawaiinfip.org	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         year), also know as t         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone A: Na         Zone AE: E         Zone AE: E         Zone AH: I         BFE detern         Zone V: C         no BFE det         Zone V: C         no BFE detern         Zone V: C         BFE detern         Zone V: C         no BFE detern         Zone V: C         BFE detern         Zone V: C         no BFE detern         Zone V: C         BFE detern         Zone V: C         no BFE detern         Zone V: C         BFE detern         Zone V: C         BFE detern         Zone X: Ar         flood zone. No mandor         but coverage is availa         Yannual         Or with C         protected         Zone X: Ar         floodplain         OTHER FLOOD AREAS	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: D BFE determined. SFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); mined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. Dastal flood zone with velocity hazard (wave action); ermined. Coastal flood zone with velocity hazard (wave action); mined. : Floodway areas in Zone AE. The floodway is the f stream plus any adjacent floodplain areas that must ee of encroachment so that the 1% annual chance be carried without increasing the BFE. : HAZARD AREA - An area in a low-to-moderate risk atory flood insurance purchase requirements apply, ble in participating communities. (shaded): Areas of 0.2% annual chance flood; areas of chance flood with average depths of less than 1 foot trainage areas less than 1 square mile; and areas by levees from 1% annual chance flood. reas determined to be outside the 0.2% annual chance
FIOOD Hazard As Property Information Not COUNTY: HAWAII TMK NO: (3) 2-2-033:011 WATERSHED: WAILOA PARCEL ADDRESS: ADDRESS NOT DETERMINED HILO, HI 96720 FIOOD HAZARD INFORMATION FIRM INDEX DATE: SEPTER LETTER OF MAP CHANGE(S): NONE FEMA FIRM PANEL: 15516 PANEL EFFECTIVE DATE: SEPTER THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/dam/ THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: YES FOR MORE INFO, VISIT: http://dhreng.hawaii.gov/dam/ More The Hawaii Department of Land and Natural Resource the use, accuracy, completeness, and timeliness of any information responsible for verifying the accuracy of the information and agree this map has been identified as 'BELIMINARY' please note the	ASSESSMEIL REPORT www.hawaiinfip.org	SPECIAL FLOOD HAZ         THE 1% ANNUAL CH         Year), also know as to         being equaled or exc         AH, AO, V, and VE.         elevation of the 1%         purchase applies in th         Zone AR: Na         Zone AR: I         BFE determ         Zone AC: Sloping ter         Zone V: C         no BFE determ         Zone V: C         Determine         Zone V: C         no BFE determ         Zone V: C         BFE determ         Zone V: C         BFE determ         Zone V: C         no BFE det         Zone V: C         no BFE determ         Zone V: C         Determine         Zone V: C         Determine         Zone V: C         no BFE determ         Zone V: C         BFE determ         Zone V: C         BFE determ         Zone XS (D)         Ibod zone. No mandor with corrotected         Zone X: An floodplain         OTHER FLOOD AREAS         Inimed, bu         NON-SPECIAL FLOOD AREAS	ARD AREAS (SFHAs) SUBJECT TO INUNDATION BY IANCE FLOOD - The 1% annual chance flood (100- he base flood, is the flood that has a 1% chance of eeded in any given year. SFHAs include Zone A, AE, The Base Flood Elevation (BFE) is the water surface annual chance flood. Mandatory flood insurance ese zones: D BFE determined. SFE determined. Flood depths of 1 to 3 feet (usually areas of ponding); mined. Flood depths of 1 to 3 feet (usually sheet flow on rain); average depths determined. Dastal flood zone with velocity hazard (wave action); ermined. Coastal flood zone with velocity hazard (wave action); mined. Floodway areas in Zone AE. The floodway is the is stream plus any adjacent floodplain areas that must ee of encroachment so that the 1% annual chance be carried without increasing the BFE. HAZARD AREA - An area in a low-to-moderate risk altory flood insurance purchase requirements apply, ble in participating communities. (shaded): Areas of 0.2% annual chance flood; areas of chance flood with average depths of less than 1 foot rainage areas less than 1 square mile; and areas by levees from 1% annual chance flood. teas determined to be outside the 0.2% annual chance pub the coverage in emileble in experiments apply. Justudied areas where flood hazards are undeter- t flooding is possible. No mandatory flood insurance pub the coverage in emileble in experiments and the pub interval to the participating communities and areas by levees from 1% annual chance flood.

-Figure 42
Tsunamis in Hawai'i can be generated locally or from a distant source. Local tsunamis have minimal warning and response times. A local tsunami can be generated from an earthquake, surface faulting, liquefaction, and landslides (Tetra Tech, 2020). Distant tsunamis can travel across the Pacific from locations such as Chile, Alaska, and Japan.

Several tsunamis have impacted Hilo Bay since the 1800s, ranging from small to severe. Hilo Bay is well known for its horseshoe shape, which has caused tsunami waves to funnel and increase in height drastically. According to the Pacific Disaster Center, the most devastating tsunamis to hit Hilo occurred in 1946 and 1960. On April 1, 1946, a magnitude-7.1 earthquake originated in the Aleutian Islands of Alaska. This earthquake generated a succession of seven tsunami waves that impacted Hilo Bay and Laupāhoehoe Point with no warning. The maximum wave height reached 55 feet. A total of 170 people were killed in the event. The loss of life prompted the establishment of the Pacific Tsunami Warning System in 1948.

Fourteen years later, in 1960, a magnitude-9.5 earthquake occurred in Chile. It is known as the Valdivia or Great Chilean earthquake, the largest earthquake recorded in the 20<sup>th</sup> century. Initially, a series of tsunami waves to reach Hilo Bay were just over 3 feet, however, subsequent waves grew to over 35 feet, taking the lives of 61 people. Despite ample warning, some residents refused the evacuate their homes, potentially due in part to two smaller tsunamis, which occurred in 1952 and 1957 that caused minimal damage to the area. Additionally, with the initial waves reaching under 5 feet, some residents who had evacuated returned to their homes before the larger waves hit. Whole city blocks were swept clean of buildings and 580 acres were flooded. **Figure 43** shows approximate tsunami travel time in hours from Alaska and Chile.



Figure 43: Potential Tsunami Travel Times in the Pacific Ocean

#### Impacts and Mitigation Measures

According to the Hawai'i County Hazard Mitigation Plan, potential flooding from storm damage is relatively low in the lower Waiākea area due to the effectiveness of the Wailoa and Waiākea-Uka Flood Control Projects. Since the Property is also outside of the 500-year floodplain, overall flooding risk for the site is low. A topography survey also found no evidence of any drainage issues.

Tsunami warning sirens are situated in the area to alert residents of an evacuation event. Tsunami evacuation route signs are posted within the designated zone to identify the best possible route to follow. The warning sirens are routinely tested and can be clearly heard from the subject site. The proposed deep well will be monitored 24/7 and designed for rapid capping in the event of a tsunami to prevent any contamination potential.

#### Environmental Setting: Sea Level Rise and Storms

It is likely that sea level rise and more frequent and intense storms will affect the Hawaiian Islands due to a rapidly changing climate. The Hawai'i Climate Change Mitigation and Adaptation Commission (HCCMAC) states that sea level rise is expected due to the increase of anthropogenic Greenhouse Gas emissions into the atmosphere.

"Sea level rise is an inevitable outcome of global warming that will continue through many centuries even if human-generated global greenhouse gas (GHG) emissions were stopped today. Sea level is rising at increasing rates due to global warming of the atmosphere and oceans and melting of the glaciers and ice sheets. Rising sea level and projections of stronger and more frequent El Niño events and tropical cyclones in waters surrounding Hawai'i all indicate a growing vulnerability" (HCCMAC, 2017).

Scientists predict that global mean air temperatures will increase by 2.7 °F by the end of the century. Increases in air temperatures will subsequently lead to increased ocean temperatures, which are expected to be the highest in tropical and subtropical areas of the Northern Hemisphere. The IPCC's "business as usual" scenario predicts that global sea levels will rise by 3.2 feet by the end of the 21<sup>st</sup> century (IPCC, 2014). There are varying theories regarding when these rising levels will be felt globally. HCCMAC suggests the sea level rise of 3.2 feet can expected by 2100, however, IPCC (2014) and Fletcher (2010), claim this level may be experienced as early as 2060. Hawai'i Island is expected to be the least vulnerable compared to neighboring islands, but areas such as Kona, Puakō, Kapoho and Hilo Bay may "face serious threats." **Figure 44** displays a 3.2-foot sea level rise in relation to the subject Property.

The Big Island is also sinking into the Earth's mantle because of the gravitational weight of its growing volcanoes, which can contribute to perceived sea level rise. Relative sea level rise is a result of the combined eustatic water rise and land subsidence. Tidal records taken in Hilo and Honolulu since 1946 show higher sea level rise on Hawai'i Island, compared to O'ahu. Many factors could contribute to this variability; however, the most likely explanation is subsidence. Moore and Fornari (1984) studied drowned reefs off the northwestern coast of Hawai'i Island. Their studies suggested a regional rate of subsidence between 1.8 and 3 millimeters per year over

# **3.2-foot Sea Level Rise Map in Relation to the Subject Property**



Figure 44

255,000 years. This data was further proven by Ludwig et al. (1991), by dating coral reefs over 475,000 years, which concluded a subsidence rate of 2.6 millimeters per year.

According to Collins et al. (2019), as outlined in an IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, climate change and subsequent sea level rise will likely increase the intensity and frequency of storms.

"The average intensity of tropical cyclones, the proportion of Category 4 and 5 tropical cyclones, and the associated average precipitation rates are projected to increase for a 2°C global temperature rise above any baseline period (*medium confidence*). Rising mean sea levels will contribute to higher extreme sea levels associated with tropical cyclones (*very high confidence*). Coastal hazards will be exacerbated by an increase in the average intensity, magnitude of storm surge, and precipitation rates of tropical cyclones."

Historically the Island of Hawai'i has been viewed as largely protected from experiencing storms of this magnitude due to the presence of Mauna Loa and Mauna Kea. However, recent years have shown that storms such as Iselle (2014) and Lane (2018) can have very damaging effects to the island.

On August 8, 2014, Hurricane Iselle made landfall in the Puna District of Hawai'i County as a moderate tropical storm with sustained wind speeds of 70mph. Significant damage was felt in the southeastern portions of the Big Island, especially in the Wai'ōpae area, which is a coastal stretch dotted with anchialine ponds and tidepools, known as the Kapoho Tide Pools. Many homes were heavily damaged in this area, which is located over 20 miles southeast from the subject Parcel. Hurricane Lane occurred in late August 2018 and brought significant damage to Hawai'i Island. The hurricane sat just west of the island for several days, bringing torrential rainfall and flash flooding. Parts of the Island of Hawai'i experienced 40 to 56 inches of rain, downed trees, and power lines. Flood waters prompted Bayfront Highway to close. Water rescues occurred in Hilo at Kaiulani Street with water levels as high as 5 feet. A Presidential Disaster Declaration was made for both Hurricane Iselle and Lane.

#### Impacts and Mitigation Measures

The proposed project will not be impacted by storm surge based on the distance from the coast, Wailoa River and Waiākea Fishpond. Anticipated sea level rise of 3.2 feet will not have a significant impact on the Property. Any changes in water levels within Wailoa River and Waiākea Fishpond are not expected to reach the site. Additional flooding potential due to sea level rise is possible but is not expected to have significant adverse effects to the proposed action.

#### 3.1.4 Water Quality

#### Environmental Setting

There are three (3) surface water bodies near the subject site: Wailoa River, Waiākea Fishpond, and Hilo Bay. Hilo Bay and Waiākea Fishpond are both listed as impaired water bodies by the Department of Health (DOH). A water body is considered impaired when monitoring data has

shown that the water exceeds the State's water quality standards. The list is updated every two (2) years, most recently in 2022. **Figure 45** shows current impaired water bodies in red.

According to the 2022 State of Hawai'i Water Quality Monitoring and Assessment Report:

"The Hawai'i State Department of Health (DOH) is obligated by the Clean Water Act (CWA) Sections 303(d) and 305(b) to report on the State's water quality on a two-year cycle...The CWA [Section] 305(d) requires states to submit a list of waters that do not attain applicable water quality standards (WQS), plus a priority ranking of impaired waters for Total Maximum Daily Loads (TMDL) development based on the severity of pollution and the uses of the waters."

The main WQS parameters assessed in this report include fecal indicator bacteria (enterococci), turbidity, chlorophyll *a*, nutrients (total nitrogen, nitrate+nitrite-nitrogen, ammonium-nitrogen, total phosphorus), and where applicable, total dissolved nitrogen and phosphorus, total suspended solids, and orthophosphate.

Water quality issues from algae, murky water, and nitrogen and/or phosphorus buildup are noted for Hilo Bay, and nitrogen and/or phosphorus for Waiākea Fishpond. Waiākea has an additional water quality concern of arsenic found in the sediment at the bottom of the pond, which is the result of pollution from a former canec plant that operated over <sup>1</sup>/<sub>4</sub> mile from the subject Property in the early to mid 1900's. This will be further discussed in Section 3.1.7.

Water quality can be impacted by both point and non-point source pollution such as construction and storm water runoff. Approximately 2.52 acres of land will be disturbed by the proposed construction activities. A National Pollutant Discharge Elimination System (NPDES) permit will therefore be required. A Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the environmental review process and is summarized below. A full copy of the report can be found in **Appendix B**. A drainage study will be completed to establish any additional BMPs and mitigating measures necessary. Offsite road work would also include drainage mitigation which could potentially improve conditions in the area with regards to storm water runoff.

#### Impacts and Mitigating Measures

The proposed action does not pose a significant adverse risk to water quality, aquatic, or marine habitats. Drilling activities are not expected to produce any adverse impacts to water quality or drinking water sources. There are no known drinking water sources down-gradient of the proposed drill site. The proposed action is also not expected to have any impact on surface water resources. Mitigating actions will include installing casing to minimize potential loss of drilling fluids into shallow formations located above the subject aquifer.

# Department of Health Impaired Waterways Map



Figure 45

Hawaiian Kingdom Brands will ensure all earthwork and construction will be conducted in compliance with the following rules and regulations:

- (a) "Storm Drainage Standards," County of Hawai'i, 1970 and as revised
- (b) "Flood Control", Chapter 27 of the Hawai'i County Code
- (c) Standards and regulations of the Federal Emergency Agency (FEMA)
- (d) "Erosion and Sedimentation Control", Chapter 10 of the Hawai'i County Code
- (e) Conditions of an NPDES permit and any additional Best Management Practices required by the Board of Land and Natural Resources
- (f) Conditions of a Storm Water Pollution Prevention Plan, if required

The proposed action will create impermeable surfaces on the Property, which can increase the volume and rate of storm water runoff. However, as per Hawai'i County Code, Chapter 27, the volume of storm water leaving the site will not increase. A County grading permit, Storm Water Pollution Prevention Plan, and a National Pollution Discharge Elimination System permit are required since the Property will be considered an industrial site.

A Storm Water Pollution Prevention Plan (SWPPP) was prepared for this DEA by Engineering Partners, Inc. according to Hawai'i Administrative Rules, Chapter 11-55 with specific reference to Section 7 of Appendix C. The SWPPP describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. A full copy of the report can be found in **Appendix B**.

HAR Chapter 11-55, Appendix C, Section 7.2.1, requires a storm water team to oversee the development, modification, and implementation of the SWPPP. This team will be made up of the Civil Engineer of Record, General Contractor, and Construction Project Manager, who will have the following responsibilities:

- A. Civil Engineer of Record: Yen Wen Fang, P.E.
  - 1. Write the initial draft of the SWPPP and any revisions necessary to obtain approval from the Department of Health, Clean Water Branch.
- B. General Contractor (To Be Determined):
  - 1. Install and maintain storm water runoff controls and Best Management Practices (BMPs) through the duration of the construction.
  - 2. Conduct weekly inspections of the site to check storm water runoff control measures and BMPs to detect violations of and conditions which may cause violations.
  - 3. Take immediate corrective action to repair, modify, or replace any storm water control; clean up and properly dispose of spills and releases; remedy a permit violation.
  - 4. Notify the Construction Project Manager of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit, and the SWPPP.
- C. Construction Project Manager (To Be Determined):
  - 1. Oversee construction of the project and provide construction management services.

- 2. Submit additional information/documents necessary to complete the NPDES permit to the owner.
- 3. Submit information/documents for compliance with the NPDES permit conditions to the owner.
- 4. Conduct periodic site inspections for compliance with permit conditions. Check storm water runoff control measures and BMPs to detect violations of and conditions which may cause violations.
- 5. Recommend modification of the SWPPP to the owner. Recommendations shall be based on site observations and input by other storm water team members.
- 6. Maintain records of any modifications to the SWPPP including monthly reports.
- 7. Ensure members of the storm water team are aware of changes to the SWPPP and ensure changes are implemented by the General Contractor at the construction site.
- 8. Immediately notify the owner of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.
- 9. Notify the owner of situations or occurrences which may impact use of operation of the facility or its employees and users.

The following three tables (1-3) outline the sequence and details of proposed construction activities, potential construction site pollutants and mitigating measures, and descriptions of each control measure.

<b>Construction Activity</b>	Duration	Details		
Install Perimeter BMPs	One (1) Week	Biosocks/silt fences will be placed along the perimeter of the site prior to the start of any other construction work. They will remain in place throughout the duration of the project to act as filters for storm water entering and exiting the project site.		
Install Interior BMPs	N/A	Interior BMPs will be installed as applicable based on the progress of the project. For example, impermeable concrete truck washout basins will be utilized but these will not be necessary until concrete work begins.		
Rough Grading	Four (4) Weeks	Includes the excavation and embankment within the project site prior to any structural improvements. The initial stockpile/storage area(s) will be created during this phase and sediment trapping wattles will be installed to surround their perimeter.		

Table 1: SWPPP Sequence and Details of Construction Activities

Retaining Walls (if needed)	N/A	Retaining walls would be constructed throughout the site. Concrete truck washout basins will be installed prior to any concrete trucks arriving onsite for the construction of the retaining walls.		
Underground Utilities	Six (6) Weeks	Underground piping for electrical, sewer, water, and other utilities will be installed in this phase.		
Building Erection	Eight (8) Weeks	Includes the installation of the building framing and exterior finish. No additional BMPs are required for this work but the stockpile/storage areas may need to be modified.		
Finish Site Grading and Paving	Four (4) Weeks	Includes bringing the site up to final grades and the installation of Portland cement concrete pavement.		
Site Finish Work and Landscaping	Four (4) Weeks	Includes the installation of planting, painting, and other minor finishing work required.		
Removal of Temporary BMPs	One (1) Week	This task may not begin until the project has been accepted as complete by the owner and a maintenance period has elapsed, allowing all finishing to be cured and planting to be established.		

Table 2: SWPPP Potentia	l Construction	Site Pollutants	and Mitigating	Measures
-------------------------	----------------	-----------------	----------------	----------

	Table 2. Swill i Totential Construction Site Fondtants and Windgating Measures				
Activity	Pollution Issue	Mitigating Measures			
Rough and Final Grading	Grading activities leave bare earth exposed to weather, which may result in sediment being transported by storm water, introducing additional turbidity to receiving waters.	Sediment trapping wattles will be installed to intercept storm water runoff as it enters and exits the project site. These wattles will filter the runoff, preventing sediment from being released.			

Concrete Pours	Cement and other concrete are pollutants, which may affect turbidity and pH of water. These pollutants may be released while concrete is still in its plastic stage. Once the concrete has reached its initial set, there is no longer potential for these pollutants to be released.	<ol> <li>Concrete pours will be conducted in dry weather and covered if rain should come after the pour has started.</li> <li>Concrete truck washout will be directed to an impermeable basin where water will be allowed to evaporate, and the remaining sludge will be disposed of offsite.</li> <li>The sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.</li> </ol>
AC Pavement	AC paving has the potential to release oils.	Paving will be scheduled for sunny days to allow for maximum cure time prior to rainfall contacting new pavement. 2. The sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.
Fertilization for Landscaping	Fertilizers typically contain high levels of nitrogen, phosphorus, and potassium, which can result in algal blooms or other unwanted vegetative growth if they are released.	Sediment trapping wattles installed around the perimeter of the site will act as filters if any of these nutrients are contained in the storm water runoff.

### Table 3: SWPPP Definitions of Storm Water Control Measures

<b>Control Measure</b>	Description
Silt Fence	Sediment barrier composed of permeable geotextile filter fabric attached to support posts will be installed at the perimeter of the project site prior to any ground disturbing activities. Silt fence intercepts the flow of sediment laden runoff, which filters the water and traps the sediment.

Sediment Trapping Wattles (Biosock)	Mulch filled sediment trapping wattles will be installed to surround the stockpiles and storage areas as well as to surround drywell and catch basin inlets.
Stabilized Construction Entrance/Exit	Stabilized construction entrance/exit shall be installed at the beginning of the project to access construction site from paved roads. Shall be a minimum of 12" thick and 3" to 6" aggregate free of fines. This stabilized construction entrance/exit will reduce the amount of sediment tracked off-site by construction vehicles.
Compaction	Fill materials will be compacted as they are installed. This activity is intended to prevent future settlement as traffic loads are placed upon the fill but has the added benefit of making these areas less susceptible to erosion.
Vegetation	Areas of the project site that do not receive pavement (including gravel pavement) will be vegetated after applying topsoil. This activity stabilizes the soil and provides beautification of the area.

**Figures 46-48** show the BMP site plan and details. See the full SWPPP report in **Appendix B** for inspection, maintenance, and corrective action; staff training; and compliance with the Safe Drinking Water Act. Each of these procedures will be strictly followed according to HAR Chapter 11-55, Appendix C, Section 7.2.12, 7.2.13, and 7.2.14.

According to the Low Impact Development Guide (LID) Section 3.3.2 General Performance Standards, industrial areas are defined as "hotspots", which are required to use specific structural Best Management Practices (BMPs) and pollution prevention practices. These mitigating measures will be specified during the permitting process following the guidelines outlined in the LID.

Wastewater would be handled by the County sewer system. The County sewer line is proposed to be extended north from its terminus near the Mililani Street and Pi'ilani Street intersection, meeting the approval of the Department of Environmental Management and the Department of Health. Efforts to minimize wastewater from the proposed project will be discussed in Section 3.3.2.



18/2023 10:59 am 10 PB/DETES 3031 PB/DEFTES 17360-31-01 1803 BEV&KANAKA CAL





MANUFACTURER AS A PACKAGE (I.E. FABRIC ATTACHED TO POST) THE MANUFACTURER'S

METAL, MUST BE CAPABLE OF SUPPORTING

#### 3.1.5 Flora and Fauna

#### Environmental Setting: Flora

A biotic survey of the Property conducted on September 14, 2022, found no endangered or threatened species. Previous use of the Property has allowed non-native trees, shrubs, and grasses to populate the site. Typical vegetation found in the area includes Ironwood (*Casuarina equisetifolia*), Kukui (*Aleurites moluccana*), Bingabing (*Macaranga grandifolia*) African tulip (*Spathodea campanulate*), Albizia (*Facaltaria moluccana*), Tropical ash (*Fraxinus uhdei*), Banyan (*Ficus benghalensis*), Areca Palms (*Areca catechu*) and numerous common weedy shrubs, vines, and grasses. One native plant, Kauna'oa kahakai (*Cuscuta sandwichiana*), was detected on the Property, although it was not rooted in the ground. All the vegetation on the Property is common and not considered rare or endemic. **Table 4** is a full list of flora found during the biotic survey.

Latin Name	Common Name	Family	Status
Falcataria moluccana	Albizia	Fabaceae	А
Commelina diffusa	Honohono grass	Commelinaceae	А
Brachiara mutica	California grass	Poaceae	А
Clusia rosea	Autograph tree	Clusiaceae	А
Polystichum munitum	Sword fern	Dryopteridaceae	А
Macaranga	Bingabing	Euphorbiaceae	А
Mangifera indica	Mango	Anacardiaceae	А
Clidemia hirta	Koster's curse	Melastomataceae	А
Cecropia obtusifolia	Trumpet tree	Moraceae	А
Mimosa pudica	Sensitive Grass	Fabaceae	А
Chamaecrista fasciculata	Partridge Pea	Fabaceae	А
Momordica charantia	Bitter Melon	Cucurbitaceae	А
Passiflora edulis	Lilikoi	Passifloraceae	А
Megathyrsus maximus	Guinea Grass	Poaceae	А
Euphorbia hirta	Hairy Spurge	Euphorbiaceae	А
Dracaena sanderiana	Bamboo	Poaceae	А
Ricinus communis	Castor Bean	Euphorbiaceae	А
Trema orientale	Gunpowder Tree	Cannabaceae	А
Dypsis lutescens	Areca Palm	Arecaceae	А
Epipremnum pinnatum	Pothos Vine	Araceae	А
Momordica charantia	Bitter Melon	Cucurbitaceae	А
Clusia rosea	Autograph Tree	Clusiaceae	Α
Cenchrus clandestinus	Kikuyu Grass	Poaceae	А
Crotalaria sp.	Rattlepod	Fabaceae	А

Table 4: Flora Found on the Subject Property

Sphagneticola trilobata	Bay Biscayne	Asteraceae	А
Tibouchina Herbacea	Cane Tibouchina	Melastomataceae	А
Ficus benghalensis	Banyan	Moraceae	А
Paspalum dilatatum	Dallis Grass	Poaceae	А
Paederia foetida	Stinkvine	Rubiaceae	А
Polygala polygama	Racemed milkwort	Polygalaceae	А
Indigofera suffruticosa	Anil de Pasto	Fabaceae	А
Canavalia rosea	Baybean	Fabaceae	А
Vigna luteola	Hairypod Cowpea	Fabaceae	А
Cestrum nocturnum	Night-blooming Jasmine	Solanaceae	Δ
Fraxinus uhdei	Tropical Ash	Oleaceae	A
Desmodium incanum	Creeping Beggarweed	Fabaceae	А
Justicia betonica	White Shrimp Plant	Acanthaceae	А
Cyperus rotundus	Nutgrass	Cyperaceae	А
Solanum nigrum	Popolo	Solanaceae	Ι
Cuscuta sandwichiana	Kauna'oa Kahakai	Convolvulaceae	Ν
Cocos nucifera	Coconut Palm	Arecaceae	PI
Cordyline fruticosa	Ti	Liliaceae	PI
Aleurites moluccana	Kukui Nut Tree	Euphorbiaceae	PI
N: Native PI: Polyn	nesian Introduced	A: Alien	

#### Environmental Setting: Fauna

Several common birds were also detected during the survey, including Common Myna (*Acridotheres tristis*), Spotted Dove (*Streptopelia chinensis*), House Finch (*Carpodacus mexicanus*), Saffron Finch (*Sicalis flaveola*), and Japanese White-Eye (*Zosterops japonicus*). A dragonfly species was also seen flying over the Property but was not identified.

Nēnē habitat ranges from sea level to 7,000 feet. Flocks move between high elevation feeding habitats and lowland nesting areas. Wailoa River State Park is a popular nesting ground and habitat for Nēnē. No Nēnē were seen during the biotic survey.

The site is not known to be a habitat for any rare or endangered animal life. However, it would be possible to find the Hawaii Hawk (I'o) (*Buteo solitarius*), the Hawaiian Owl (Pueo) (*Asio flammeus sandwichensis*), and the Hawaiian Hoary Bat or 'Ope'ape'a (*Lasiurus cinereus semotus*) flying over, roosting, or utilizing resources near the Property.

The Indian mongoose (*Herpestes a. auropunctatus*) was detected near the site. It is also possible for feral cats (*Felis catus*) and chickens (*Gallus gallus domesticus*) to also be present at times.

#### Impacts and Mitigating Measures

Construction and operation activities will have little impact to native biological communities. The Property has been previously cleared, including most recently in April 2022 under a SMA Minor Permit approved by the Planning Department in January of 2021. There was one native plant detected known as Kauna'oa kahakai (*Cuscuta sandwichiana*) although it was not rooted in the ground. *Cuscuta sandwichiana* is a parasitic vine and requires a host plant to survive.

Since the proposed action will involve the use of screening landscaping, and there is potential for native endangered birds to be in the area, mitigating measures must be determined and adopted, if necessary. The State listed Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) has the potential to occur in the vicinity of the project area and may roost in nearby trees. Hoary Bats may be sensitive to disturbance between June 1<sup>st</sup> and September 15<sup>th</sup>, throughout which no shrubs or trees taller than 15 feet may be disturbed, removed, or trimmed without consulting the DLNR Division of Forestry and Wildlife (DOFAW). The State listed Hawaiian Hawk, or 'Io (*Buteo solitarius*) is also known to occur in the project vicinity. If any tree cutting occurs between March and September, DOFAW must be consulted first. A pre-construction hawk nest search by a qualified ornithologist using standard methods must be conducted. If nests are found, no land clearing is permissible until October.

According to DOFAW, artificial lighting can adversely impact seabirds that may pass through the area at night by causing disorientation. The disorientation can result in collision with manmade artifacts or grounding of birds. For nighttime lighting that might be required, DOFAW recommends that all lights be fully shielded to minimize impacts. Nighttime work that requires outdoor lighting should be avoided during the seabird fledging season from September 15<sup>th</sup> through December 15<sup>th</sup>. This is the period when young seabirds take their maiden voyage to the open ocean.

The movement of plant or soil material between worksites, such as fill, must be minimized. Soil and plant material may contain invasive fungal pathogens such as Rapid 'Ōhi'a Death (ROD), vertebrate and invertebrate pests such as Little Fire Ants (*Wasmannia auropunctata*), or invasive plant parts that could harm native species and ecosystems. All equipment, materials, and personnel should be cleaned of excess soil before leaving the site. Gear that may contain soil, such as work boots and vehicles, should be thoroughly cleaned, and sprayed with 70% alcohol solution to prevent the spread of ROD and other harmful fungal pathogens. If any material removed from the site is moved to areas without fire ants or ROD, the material will be inspected and treated. No 'Ōhi'a trees are present on the Property; therefore, none will be cut down during construction.

#### 3.1.6 Air Quality, Noise, and Scenic Resources

#### Environmental Setting

The air quality in the vicinity of the Property is generally very good. Heavy vog is not usually a concern for this part of Hilo during past Kīlauea eruptions. Vog is created when sulfur dioxide reacts chemically with sunlight, oxygen, dust particles, and water in the air. During eruptions, the trade winds generally keep the Hilo area free from severe conditions, however, weak winds,

particularly in the winter, may result in worse atmospheric quality. Air quality related to emissions is not an immediate concern since current Kīlauea activity is minimal.

Noise near the subject site is moderate. The area is urban and other businesses are present to the east and south. Manono Street is also located to the east, which generates moderate noise levels from vehicular traffic. The Afook-Chinen Civic Auditorium and the Francis Wong Stadium located to the northeast occasionally hold events and baseball games, which can also generate moderate noise.

Goals and policies to preserve areas of natural beauty are outlined in the County of Hawai'i General Plan. These standards are designed to prevent encroachment on scenic features such as black sand beaches and tidal ponds. The Wailoa River State Park is located 625 feet to the west of the subject Property and is a significant scenic resource in the area.

#### Impacts and Mitigating Measures

Rules and regulations outlined in Hawai'i Administrative Rules Title 11, Chapter 46 "Community Noise Control," Chapter 59 "Ambient Air Quality," and Chapter 60.1 "Air Pollution," will be followed during all construction and operation activities.

Air pollutants during construction will be limited and temporary. The main sources of short-term air pollutants are construction equipment exhaust and dust. HAR §11-60 on Fugitive Dust prohibits visible emissions of dust from constriction activities. These regulations will be strictly followed to prevent dust impacts to Pi'ilani Street, Mililani Street, and Manono Street. In addition, reasonable measures to control airborne and visible fugitive dust from road areas are outlined by the Department of Health's Clean Air Branch. These measures include, but are not limited to:

- Planning the different phases of construction, focusing on minimizing the amount of airborne, visible fugitive dust-generating materials and activities, centralizing on-site vehicular traffic routes, and locating potential dust-generating equipment in areas of the least impact.
- Providing adequate water sources at the site prior to start-up of construction activities; Landscaping and providing rapid covering of bare areas, including slopes, starting from the initial grading phase.
- Minimizing airborne, visible fugitive dust from shoulders, and access roads.
- Providing reasonable dust control measures during weekends, after hours, and prior to daily start-up of construction activities.
- Controlling airborne, visible fugitive dust from debris being hauled away from the project site.

These mitigating measures will be used during construction to prevent significant impacts from dust to roadways in the area.

During operation, the main source of air pollution will be through regular vehicle trips including the movement of employees, café and drive through customers, truck trips for pickups and deliveries, and exhaust from the café and coffee roasting activities.

The TIAR estimates 108 vehicular trips during AM peak hours and 36 vehicular trips during PM peak hours. Idle emissions are not anticipated to produce adverse impacts due to the low number of anticipated trips and nature of products offered (i.e., coffee, tea, water, and pre-made food items). Approximately two (2) to four (4) truck trips are expected daily. Trucks will be utilized to pick up and deliver local coffee beans and fresh produce. Bottled water and coffee products will be delivered by truck across to the Hilo port and across the Island of Hawai'i. These additional trips are not expected to measurably impact air quality. With higher EPA standards for vehicular air emissions, plus the need to comply with appropriate Department of Health Air Quality standards, the impact to the ambient air quality should not be significant.

Coffee is proposed to be roasted daily, which will produce some exhaust. Exhaust from coffee roasting activities will follow all County and State regulations, including the use of ventilation systems according to Chapter 11-48 of the Hawai'i Administrative Rules. All exhaust will be pumped vertically into the air to avoid settling in low lying areas. In addition, roasting is proposed to occur during morning hours to minimize noise impacts.

The subject Property is in an area with mixed zoning including Open, Commercial, and Residential. The Property itself is zoned Limited Industrial ML-20. According to Hawai'i Revised Statues Chapter 342F, *Noise Pollution*, Industrial areas allow noise levels to reach 70 decibels for both daytime (7 AM – 10 PM) and nighttime hours (10 PM – 7 AM). Commercial areas allow 60 and 50 decibels for daytime and nighttime hours, respectively, and Residential allows 55 and 45 decibels for daytime and nighttime hours, respectively.

Noise generated by activities on site are not expected to exceed 70 decibels during daytime or nighttime hours. This includes noise generated onsite from the café, the beverage bottling plant, including coffee roasting, and well operations. The beverage bottling plant is proposed to be constructed with steel and insulated with R19 on sidewalls and R30 on the ceiling to abate noise from roasting and bottling equipment. This will largely mitigate noise emitted to nearby properties and Wailoa River State Park.

Short-term noise impacts may occur during construction from excavation, grading, vehicle and equipment operation, and the construction of new infrastructure. Most of these impacts will be temporary and mitigated through Best Management Practices. It is possible that a noise permit may need to be sought if there is ever a potential for construction noise to exceed the Department of Health's maximum permissible noise levels.

During operation, sources of noise may occur from regular vehicle and truck trips, café customers, and warehouse/manufacturing plant activities. Most of these sources will be limited to typical workday hours. Proposed bottling plant operation hours are Monday to Friday 6 AM - 6 PM. The proposed operation hours for the café are Monday to Friday 6 AM - 8 PM.

The café/restaurant will operate under standard noise levels compared to similar establishments. The outdoor seating area is proposed to be small and should not have a significant impact to noise. Preliminary plans have the proposed well located within a concrete structure, which should operate nearly silent after construction is complete.

Other mitigating measures can be applied to the proposed project if it is determined that a lower decibel maximum is appropriate for the area (for example, Commercial level standards). Such measures may include high performance mufflers on the drilling equipment, construction of baffles around the rig motors as required, placement of the rig, and ancillary equipment to minimize noise propagation into the area.

The County of Hawai'i General Plan outlines regulations to preserve areas of natural scenic beauty. No significant visual impacts would occur to scenic resources in the area. The café and drive through will be aesthetically pleasing, with site landscaping according to Planning Department Rule 17 and Hawai'i County Code Chapter 25-5-117.

Light pollution is another important aspect of maintaining scenic resources, the visibility of the night sky, and the protection of seabirds that may utilize resources near the subject Property. Therefore, the following guidelines to minimize light pollution will be adhered to:

- 1. Any outdoor lighting must conform to the standards established by the Hawai'i County Outdoor Lighting Ordinance (Hawai'i County Code Chapter 14, Article 9: "Outdoor Lighting").
- 2. The minimum possible amount of outdoor/exterior lighting should be used and should be turned off when not needed. Motion sensor activated lighting will be used wherever feasible.
- 3. All exterior lighting should be fully shielded. This means that all lighting fixtures must emit zero light above the horizontal plane.
- 4. Conformity to the Outdoor Lighting Ordinance also requires the use of blue-deficient exterior lighting. This means that exterior LED lighting must emit less than 2% of its total energy at wavelengths less than 500 nm. The best choice for this is either filtered LED lights, or amber LED lights.
- 5. White light should be avoided. Any white light used should have Correlated Color Temperature of 2700 K or below.
- 6. Rig lights during construction and operation of the proposed water well must be shielded to minimize stray lighting.

#### 3.1.7 Hazardous Substances, Toxic Waste, and Hazardous Conditions

#### Environmental Setting: Historical Use

Waiākea Fishpond has historically been polluted by both point and non-point sources of arsenic pollution. A former canec plant once operated on the southeast corner of Waiākea Fishpond from 1932 to 1963. Canec board was made from pressed sugarcane fiber and widely used for walls and ceilings of buildings. Arsenic was added to canec boards to deter termites and prevent damage. Approximately 500 tons of arsenic compounds were released into Waiākea Fishpond from the former plant's sewer line over its 30 years of operation. Arsenic based herbicides and

pesticides were also widely used throughout the copious sugarcane fields in the Hilo area. Erosion and runoff of soil from former sugar cane fields in upland areas likely also contributed to arsenic present in the pond sediment today (DOH, 2019).

Arsenic contamination largely remains within sediment found at the bottom of the pond; however, it is possible historical tsunamis spread contaminated sediment to nearby properties. Therefore, an Environmental Site Assessment was conducted in 2018 to determine whether any current or past hazardous substances are present on the site.

A Phase I Environmental Site Assessment (ESA) was conducted on the subject Property in March 2018 by Lehua Environmental Inc. in accordance with the Environmental Protection Agency (EPA) and American Society for Testing and Materials (ASTM) standards. The assessment was conducted to evaluate existing conditions, investigate the environmental history, and identify the presence of Recognized Environmental Conditions (REC's) within and around the site. According to the report, a <u>current</u> REC is defined as:

"The presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat to a future release to the environment." (ASTM, 2013).

In contrast, a past REC is defined as:

"A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls" (ASTM, 2013).

Research for this study consisted of a review of historical and regulatory records, present conditions, site geology and hydrogeology, Federal, State, and local databases of known or potentially hazardous waste sites, landfills, and sites currently under investigation for environmental violations. According to the report, the assessment revealed no evidence of past or current RECs in connection with the site and thus confirmed that a Phase II study was not necessary. The full ESA report can be found in **Appendix A**.

#### Impacts and Mitigating Measures

The Environmental Site Assessment found no evidence of past or current RECs, which means any potential contamination from past tsunami events or former land use that impacted the property is no longer detectable.

The risk of arsenic contaminating the deep confined aquifer from a present-day tsunami event is low. The proposed well is expected to be under significant artesian pressure, which would naturally prevent the ability of contaminants to infiltrate it. However, the proposed deep water well would be specifically designed to be properly capped with little warning. This will be a required condition of the Well Permit meeting the approval of CWRM and the Department of Health due to proximity to Hilo Bay and Waiākea Fishpond.

#### Environmental Setting: Proposed Use

No hazardous materials will be used throughout the drilling process that has the potential to contaminate any surface or ground water resources.

No hazardous waste is anticipated to be produced from the proposed action. The quantity of solid waste that the proposed development will produce is unknown. However, the site will have various solid waste management collection areas for the beverage bottling plant and café and will adhere to solid waste management best practices to mitigate any negative impacts. Services to dispose of waste will be contracted through local waste management companies. Recycling stations will also be placed throughout the facility. Efforts to reuse safe organic matter will be implemented into the proposed project. Such efforts include providing used coffee grounds for garden use to customers.

A solid waste management plan will be developed if required by the Department of Environmental Management prior to completion and operation of the project. During operation, petroleum products may be used for onsite machinery and equipment or landscape maintenance.

#### Impacts and Mitigating Measures

Solid waste generated by the development will require private disposal at the Hilo landfill or other designated landfill sites as required by the County.

Following the guidelines of State and County requirements to minimize the possibility for spills and hazardous materials during construction, the applicant proposes the following:

- Construction activities with the potential to produce polluted runoff will be limited to periods of low rainfall
- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to "Good Housekeeping" for all appropriate substances, with the following instructions:
  - Onsite storage to minimum practical quantity of hazardous materials necessary to complete the job;
  - Fuel storage and use will be conducted to prevent leaks, spills or fires;
  - Products will be kept in their original containers unless un-resealable, and original labels and safety data will be retained
  - Disposal of surplus will follow manufacturer's recommendation and all regulations;
  - Manufacturers' instructions for proper use and disposal will be strictly followed;
  - Regular inspection by contractor to ensure proper use and disposal;
  - Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance;
  - Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean; and

- All spills will be cleaned up and properly disposed of immediately after discovery.
- Unused materials and excess fill (if any) will be properly disposed of at an authorized waste disposal site.

Petroleum products can be considered hazardous if not handled or stored properly. All petroleum products will be stored in the beverage bottling plant, which will be managed by qualified personnel. Personnel who have completed the proper education and training will be the only qualified individuals to handle such products, which will only be used according to the original label on the container. Material Safety Data Sheets (MSDS) must be made readily available and visible within the maintenance building. Personal Protective Equipment (PPE) will be used at all times and checked regularly.

If at any time, hazardous substances or waste are discovered on the Property during construction, all work will cease, and appropriate authorities will be contacted. A remediation specialist can be contacted to supervise the appropriate disposal and management of substances, if deemed necessary. Hawaiian Kingdom Brands will require all users and occupants of the proposed facilities to follow all government regulations pertaining to hazardous and toxic substances.

### 3.2 Socioeconomic and Cultural

#### 3.2.1 Land Use, Socioeconomic Characteristics, and Recreation

#### Environmental Setting

The subject property is zoned Limited Industrial ML-20. The parcel is bordered by Pi'ilani Street to the south and by vacant land to the north, east, and west. Properties further to the north, east and west are Resort-Hotel 750 square feet (V.75), and properties located further south are zoned General Commercial 7,500 square feet (CG 7.5).

Open zoning is present on the east side of Manono street where the Afook-Chinen Civic Center lies. Other surrounding land uses vary and include:

- The Hilo marina is located roughly 1,300 feet to the north
- Ho'olulu Park is located to the northeast/east, which hosts the Walter Victor Baseball Complex, Francis Wong Stadium, and the Afook-Chinen Civic Center (roughly 800, 950 and 450 feet from the subject Property)
- The Manono mini mart convenience store and Luquin's restaurant are located approximately 130 feet to the south
- Hooganji Buddhist mission is roughly 450 feet to the south
- Wailoa Plaza and Waiākea Villas residential complex are located roughly 1,000 feet to the southwest

The nearest point of the Wailoa River/Waiākea Fishpond is approximately 625 feet to the west. The mouth of the Wailoa River where it enters Hilo Bay is approximately 2,300 feet to the north.

#### Impacts and Mitigation Measures

No significant impacts are anticipated to land use, socioeconomic characteristics, or recreation. Recreation in Wailoa River State Park will not be impacted during construction or operation. The proposed project will be a convenient resource for park and civic center users. It will also provide stable job opportunities for up to 100 residents when fully operational. The café kitchen will be available to the community outside of café open hours for public use and benefit. A community kitchen is a shared cooking space where individuals can come together to prepare and share meals. Interested community members will be able to sign up to schedule time in the kitchen for a small fee. No fee will apply to non-profit organizations and native Hawaiians. The community kitchen will not support food trucks and will not host community events or classes. The intention behind providing a community kitchen is to promote social interaction, encourage healthy eating, and improve food security.

#### 3.2.2 Cultural and Historic Resources

#### Environmental Setting: Cultural Background

Hawai'i is believed to be first inhabited by voyagers from the Marquesas around 1,000 A.D, however, recent studies have shown that initial Polynesian colonization of Hawai'i Island occurred between 1220 and 1261 A.D.

Early Hawaiian settlements incorporated new strategies and structures to adapt to their new environment. Traditional Polynesian philosophies and ideals were used to form new societal standards and structures including the principle of genealogical seniority, observance of gods such as *Kāne, Ku, and Lono*, the *kapu* system of law and order, *ahupua* 'a land systems, and various beliefs and values that determined day-to-day protocol and lifestyle such as *mana* and the 'aumakua.

It is believed that Hilo is likely one of the first settlements on Hawai'i Island. Hilo is known to have rich marine resources accessed at Hilo Bay and additional abundant resources from the forests that descend from Mauna Loa and Mauna Kea. Ancient Hawaiians understood the critical importance of fresh water. Fresh water streams and springs were believed to be created by the gods Kāne and Kanaloa, which established a spiritual connection between people and water. In accordance with the native Hawaiians respect for water, land management units were organized around freshwater supplies in a traditional system known as the *ahupua'a* resource-management system (CWRM, 2019). According to the Water Resource Protection Plan, "water was viewed as such a critical resource to the health and well-bring of the people of ancient Hawai'i, that the concept of private ownership did not exist" (CWRM, 2019).

The *ahupua* 'a system, divided near the end of the 16<sup>th</sup> century, or early 17<sup>th</sup> century, was designed to provide all the necessary resources to live including agricultural resources inland and ocean resources at the coast. These *ahupua* 'a in the Hilo region include Pu'u'eo, Pi'ihonua, Punahoa, Pōnahawai Kūkūau and Waiākea (where the property is located). Waiākea *ahupua* 'a is one of the largest in the district, covering over 95,000 acres and provided resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly, 1981). Waiākea translates to

"broad waters" and includes the Wailoa River/Waiākea Fishpond, Reeds Bay, Kūhiō Bay and Puhi Bay (Pukui et al. 1976).

Hawaiian traditional accounts attest to the longstanding importance of Waiākea. Marine subsistence was a significant part of traditional culture and social organization. Fishponds were developed in the vicinity of Hilo Bay, including royal fishponds, which were spring-fed inland ponds reserved for the highest *ali*'*i* and religious rituals. According to Haun & Associates (2018), "The chief of the Hilo region, Kulukulu'a, who resided in Waiākea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawai'i Island."

The largest known royal fishpond is the Waiākea Fishpond located roughly 625 feet east of the subject Property. A dedicated fishing ground or *ko* '*a* known as Maka-o-kū was located near present day Coconut Island, roughly 0.75 miles northeast of the subject site. Strict *kapu* were enforced throughout the Waiākea region, which dictated when and where certain varieties of fish could be caught (Kelly et al. 1981). Farming was also essential to the residents of Waiākea through the cultivation of wet and dry taro (Maly 1996; Handy and Handy 1972).

Today, there has been a resurgence in traditional uses of water resources, which often rely on surface water sources and coastal springs for traditional and customary practices and subsistence activities (CWRM, 2019).

#### Environmental Setting: Historical Background

The earliest documentation of Hilo is found in 'Umi-a-Liloa's conquest of Hawai'i Island in the sixteenth century, which established Hilo as a royal center for the island. In the account, 'Umi-a-Liloa began his conquest of the Island of Hawai'i by defeating chief Kulukulu'ā, who lived in Waiākea, and the other chiefs of Hilo. 'Umi-a-Liloa's son Keawe-nui-a-'Umi ruled Hāmākua, Hilo and Puna. After the death of Keawe-nui-a-'Umi, the ruling kingdom was divided into three parts and was established under warring chiefs (Kamakau, 1992).

In 1738 Kamehameha I was born. Chief Kalani'opu'u was the high chief during Cook's arrival in 1778. After the chief's death in 1782, his son Kiwala'o, and his nephew, Kamehameha I began to compete for control of the west side of Hawai'i Island. Kamehameha won the battle of Moku'ohai against Kiwala'o in Kona, officially controlling the western half of the island. In 1791, Kamehameha, having gained control of Hilo, fought, and won a battle against his cousin Keoua at Kawaihae for control of the entire Island of Hawai'i. At this time, fur traders and other seamen began to come to the islands. By 1791, the exploitation of sandalwood began and Hilo's reputation as a significant port emerged. A few years later, in 1795, Kamehameha conquered Maui, Moloka'i, Lana'i and O'ahu. He also received Kaua'i by cession in 1810 (Kamakau, 1992). Kamehameha's son Liholiho was born in Hilo in November 1797. Waiākea was inherited by Lihiliho after Kamehameha's death. The *'ili kūpono* of Pi'opi'o and its royal fishpond were given to his favorite wife, Ka'ahumanu.

At the end of the sandalwood era, Christian missionaries led by William Ellis, arrived at the islands. In 1824, a missionary station was established at the mouth of Wailoa River in Waiākea. By 1837, two-thirds of the population relocated to Hilo from villages outside of the area. The

mission eventually moved to the top of Haili Street from Waiākea, which established the present location of Hilo.

In 1839, King Kamehameha III signed the Bill of Rights, which sought to ensure that the people's land would not be taken from them. In 1840, the first Constitution of Hawai'i was enacted. In 1845, the Land Commission was created by Kamehameha III to award land claims, although this could not be done under the current feudal system of land tenure as individuals did not hold title to the land. In 1848 The Great Māhele (Land Division) established a system of private land ownership, which divided all Hawai'i's land into three classifications: Crown Lands, Government Lands and Konohiki Lands. Crown, Government and Konohiki lands remained subject to the rights of the *kanaka* who were in possession and cultivated the lands. As land sales between the Crown, Government and Konohiki continued, the rights of the kanaka became an issue. In 1850, the Land Commission moved to award title of land to kanaka who remained in physical possession, cultivated, or improved any portion of Konohiki Lands. These became Kuleana Lands.

By 1875 the sugar cane industry was firmly established. New sugar mills were being built, laborers were arriving from Asia and Europe, and Hilo became a thriving economic center. In 1893, the Hawaiian Monarchy was over-thrown, and Queen Lili'uokalani was imprisoned. The remaining Crown Lands were confiscated by the government and made a part of the public domain (Chinen, 1961). Hilo began to significantly change in the 1900's through the increased presence of foreign vessels, expansion and growth of tourism, the establishment of missions, private land ownership legalization, the presence of the whaling, cattle, and sugar industries, and the construction of Government roads and railroad lines (Kelly et al. 1981).

#### Environmental Setting: Archaeological Inventory Survey

An Archaeological Inventory Survey (AIS) was conducted by Haun & Associates between April 13<sup>th</sup> and April 18<sup>th</sup>, 2018. The survey identified one site of historical significance on the Property known as Site 50-10-35-1481.2. It is a concrete slab interpreted as a historic foundation or walkway, a remnant of previous industrial uses on site, which is significant for yielding information for understanding historic activity in the area. The mapping, written descriptions, and photography of Site 1481.2 adequately document it and no further work or preservation has been recommended.

Four 'displaced isolated objects' were also found during the survey and consist of a metal gear, a concrete post, and two concrete platforms. It is thought that the gear and concrete post were likely associated with historical use of the area. The concrete platforms are known to have been placed on the Property in the 1990s to support cooling towers. **Figures 49 and 50** show aerial views of Hilo and the subject Property from 1965 and 1977.

#### Impacts and Mitigation Measures

The proposed development is not expected to impact historical resources on site. Site 1481.2 identified during the AIS was adequately documented and no further work or preservation was recommended. The Hawai'i State Supreme Court's PASH and Ka Pa'akai O Ka 'Aina decisions require decision-makers to consider a project's impact to native Hawaiian practices and

resources. Specifically, prior to making a decision, State and County agencies must identify the cultural, historical, and natural resources and associated traditional and customary practices of the site, the impacts of the proposed project to those resources and practices, and the feasible action (i.e., mitigation measures), if any, to protect such resources and practices. Past land use makes it unlikely any cultural practices or traditional and customary rights would be impacted by the proposed action. However, in the event any cultural, historical, or natural resource associated with traditional and customary rights is discovered on the site, work will cease immediately, and the State Historic Preservation Division will be contacted for appropriate action.



Figure 49: 1965 USDA Aerial Photo of the Subject Property



Figure 50: 1977 USDA Aerial Photo of the Subject Property

#### 3.3 Public Roads, Services, and Utilities

#### 3.3.1 Roads and Access

#### Environmental Setting

The subject site is located on an undeveloped lot on the northeast corner of Pi'ilani Street and Mililani Street intersection. Mililani street is undeveloped north of the Pi'ilani Street, therefore current access is solely off Pi'ilani Street.

The proposed action is expected to generate vehicular trips from employees working at the manufacturing plant and café, customers for the café and drive-through, and pickup/deliveries. The project proposes to have customers for the café and drive-through access the site via an entrance-only driveway on the north side of Pi'ilani Street between Manono Street and Mililani Street. An exit-only driveway is also proposed along an undeveloped roadway that will serve as a northern extension of Mililani Street. A third two-way driveway is also being proposed along the extension of Mililani Street for manufacturing plant employees and delivery trucks.

A Traffic Impact Analysis Report (TIAR) was completed on July 6, 2022, by SSFM International to evaluate potential traffic impacts from the proposed project. The TIAR analyzed five (5) main characteristics of potential traffic outcomes with and without the project, based on existing conditions (2022) and future year projections in five (5), ten (10) and twenty (20) year intervals. These include:

- Existing operating conditions with AM and PM peak traffic hours.
- Traffic projections for <u>Future Without Project</u> in 2027, 2032, and 2042.
- Estimated vehicular trips that will be generated by the project.
- Traffic projections for <u>Future With Project</u> in 2027, 2032 and 2042.
- Recommendations for roadway improvements or other mitigating measures, as appropriate, to reduce or eliminate any adverse impacts resulting from traffic generated by the project.

The Highway Capacity Manual (HCM), 6<sup>th</sup> Edition, was used for calculating Levels of Service (LOS), volume-to-capacity (v/c) ratios, and delays using the traffic analysis software "Synchro." According to the report, Levels of Service is a quantitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A, with little to no delays, to congested conditions at LOS F, where extreme delays exist.

Traffic operations and impacts were analyzed during AM and PM peak hours at five (5) intersections within the subject area (**Figure 51**):

- 1. Hawai'i Route 19 and Manono Street/Lihiwai Street
- 2. Manono Street and Pi'ilani Street
- 3. Hawai'i Route 11 and Pi'ilani Street
- 4. Manono Street and Kekūanaōʻa Street
- 5. Mililani Street and Kekūanaōʻa Street



Figure 51: TIAR Study Intersections

Hawai'i Route 19 and 11 are State-owned highways. Manono Street, Pi'ilani Street, Kekūanaō'a Street, and Mililani Street are all County-owned roadways. These intersections were chosen by identifying significant intersections, which may be impacted by project related trips, which would add 3 percent or greater traffic to their forecasted volumes, per the Hawai'i Department of Transportation (HDOT) standard practices.

Vehicle turning movement counts were taken at the five study intersections on Wednesday, April 6, 2022, from 6:30-9:30 AM, and 3:00-6:00 PM. The AM and PM peak traffic hours occurred between 7:30-8:30 AM and 3:45-4:45 PM. Pedestrian and bicycle crossings were also studied at each intersection during the same AM and PM peak hours. Manono Street/Lihiwai Street has the highest amount of pedestrian activity, with up to six (6) peak hour pedestrian crossings during the PM hours. Hawai'i Route 11 and Pi'ilani Street had the highest bicycle activity, with six (6) peak hour bicycle movements during the PM hours (**Table 5**).

Intersection	Pede	strian	Bicyle		
Intersection	AM Peak	PM Peak	AM Peak	PM Peak	
Hawaii Route 19 & Manono Street/Lihiwai Street	2	6	1	1	
Hawaii Route 11 & Piilani Street	2	0	1	6	
Manono Street & Piilani Street	1	4	2	0	
Manono Street & Kekuanaoa Street	1	6	0	0	
Mililani Street & Kekuanaoa Street	5	3	0	0	

Table 5: Peak Hour Pedestrian and Bicycle Volumes

#### Existing Intersection LOS Analysis

- 1. Hawai'i Route 19 and Manono Street/Lihiwai Street
  - This signalized intersection has an appropriate LOS D or better and v/c of <1.0 during AM and PM peak hours.
- 2. Hawai'i Route 11 and Pi'ilani Street
  - All movements at this unsignalized Two-Way Stop Controlled (TWSC) intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.
- 3. Manono Street and Pi'ilani Street
  - All movements at this unsignalized TWSC intersection resulted in appropriate LOS C or better and v/c < 1.0 during AM and PM peak hours.
- 4. Manono Street and Kekūanaōʻa Street
  - All movements at this signalized intersection resulted in appropriate LOS C or better and v/c <1.0 during AM and PM peak hours.
- 5. Mililani Street and Kekūanaōʻa Street
  - All movements at this unsignalized TWSC intersection resulted in appropriate LOS C or better and v/c < 1.0 during AM and PM peak hours.

Table 6 below shows the existing vehicular delay and LOS at each intersection (2022).

	AM		РМ			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	19.4	-	В	23.2	-	С
Hawaii Route 19 EB Left	12.5	0.27	В	15.1	0.27	В
Hawaii Route 19 EB Through	15.1	0.35	В	19.5	0.44	В
Hawaii Route 19 EB Right	18.0	0.48	В	26.7	0.68	С
Hawaii Route 19 WB Left	11.6	0.16	В	14.8	0.22	В
Hawaii Route 19 WB Through	17.6	0.52	В	20.3	0.48	С
Hawaii Route 19 WB Right	12.8	0.02	В	15.8	0.02	В
Manono Street NB Left	26.0	0.60	С	27.0	0.71	С
Manono Street NB Through-Right	25.5	0.37	С	22.3	0.23	С
Lihiwai Street SB Left	26.0	0.08	С	27.7	0.08	С
Lihiwai Street SB Through-Right	35.0	0.74	D	37.5	0.76	D
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)
Hawaii Route 11 NB Left	19.3	0.50	С	19.9	0.37	С
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	20.2	0.23	С	20.8	0.39	С
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Manono Street NB Left-Through-Right	8.1	0.01	Α	8.2	0.01	А
Manono Street SB Left-Through-Right	8.1	0.05	Α	8.2	0.07	А
Piilani Street EB Left-Through-Right	21.6	0.16	С	22.6	0.20	С
Piilani Street WB Left-Through-Right	17.2	0.35	С	20.9	0.41	С
Manono Street & Kekuanaoa Street	29.2	-	С	29.0	-	С
Manono Street NB Left	21.8	0.25	С	21.0	0.16	С
Manono Street NB Through-Right	32.3	0.64	С	28.6	0.51	С
Manono Street SB Left	22.7	0.28	С	21.5	0.26	С
Manono Street SB Through-Right	30.0	0.56	С	32.5	0.65	С
Kekuanaoa Street EB Left	22.6	0.35	С	20.5	0.31	С
Kekuanaoa Street EB Through-Right	25.8	0.52	С	32.0	0.72	С
Kekuanaoa Street WB Left	17.2	0.07	В	22.3	0.33	С
Kekuanaoa Street WB Through-Right	33.4	0.75	С	29.2	0.63	С
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Mililani Street NB Left-Through-Right	22.1	0.13	С	16.0	0.08	С
Mililani Street SB Left-Through-Right	17.3	0.15	С	12.8	0.12	В
Kekuanaoa Street EB Left-Through-Right	8.8	0.02	Α	8.4	0.02	Α
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	Α	8.6	0.00	А

Future Without Project Conditions

A. Upcoming Planned Projects

Island Naturals Properties, LLC was granted a Special Management Area (SMA) Use Permit (No. 21-000079) to construct a 67,685 square foot retail and office complex on the Northwest corner of Mililani Street and Kekūanaō'a Street, roughly 0.25 miles south of the subject site. This development is expected to include a one-stop commercial retail and office center, including relocating the current Island Naturals grocery store. Full buildout is expected by 2026. No TIAR was conducted for the SMA application. However, the background report estimates that the development will generate at least 50 vehicular trips during peak hours. The background report also discusses implementing two (2) full movement access driveways, one off Mililani Street, and one off Hualani Street, with the belief that dividing left-turn movements between these side-streets will help reduce congestion. In addition, the developer is suggesting the inclusion of two right-in, right-out driveways off Kekūanaō'a Street to minimize or eliminate the backup of traffic on Kekūanaō'a Street. In response, the County of Hawai'i Department of Public Works has recommended a leftturn lane in the eastbound direction be installed at the intersection of Kekūanaō'a Street and Mililani Street; however, it is unclear if this will be implemented.

According to SSFM, the proposed land uses outlined in the Island Naturals SMA application are estimated to generate 282 additional AM peak hour trips and 486 additional PM peak hour trips, as shown in **Table 7**. The SMA application estimates the total number of peak hour trips to be much lower due to unspecified trip reduction factors. It is worth noting that the current location of the grocery store already generates many of these trips in the surrounding road network, so the overall trip generation from the development may be limited to the other planned developments in the proposed complex. Even without the trips from the grocery store, the total number of AM and PM peak hour trips is expected to be 208 and 226 vehicles, respectively. It is important to note that the anticipated trip generation for the Hawaiian Kingdom Brands proposed action is projected to be significantly lower than the unadjusted trip generation for the Island Naturals development.

Phase/Land Use	Area (1000 SF)	ITE Land Use	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Phase 1								
Island Naturals Store	26.0	850 - Supermarket	44	30	74	130	130	260
Office Space	8.9	710 - General Office Building	18	3	21	4	18	22
Total:			62	33	95	134	148	282
Phase 2								
Drive-Through Restaurant	3.0	934 - Fast Food Restaurant with Drive-Through	68	66	134	52	47	99
Total:			68	66	134	52	47	99
Phase 3								
Retail Space	10.3	822 - Strip Retail Plaza (<40k)	18	11	29	40	40	80
Office Space	10.3	710 - General Office Building	21	3	24	4	21	25
Total:			39	14	53	44	61	105
Total of All Phases:			169	113	282	230	256	486

Table 7: Estimated Vehicular Trips to be Generated by the Island Naturals Complex

#### B. Background Growth

The Statewide Federal-Aid Highways 2035 Transportation Plan for the State of Hawai'i forecasts an annual increase in traffic volume of 1.28 percent between 2007 and 2035 in South Hilo. Historical HDOT traffic volumes along Manono Street varied between 2013-2022. Recorded traffic counts in 2013 along Manono Street were 10,723. Compared to pre-pandemic volumes in 2019, which were slightly lower at 10,320. **Figure 52** below shows a 1.28 percent growth rate applied to high-volume regional traffic movements (identified with red arrows).



Figure 52: Study Intersection Regional Traffic Volume Movements

- C. Future 2027, 2032 and 2042 Without Project Peak Hour Conditions and LOS at Each Study Intersection (Figures 53-55 and Tables 8-10)
  - 1. Hawai'i Route 19 and Manono Street/Lihiwai Street

All movements at the signalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during AM and PM peak hours in 2027, 2032 and 2042.

2. Hawai'i Route 11 and Pi'ilani Street

All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours in 2027 and 2032.

In 2042, all movements resulted in LOS D and v/c <1.0 during the AM and PM peak hours.

3. Manono Street and Pi'ilani Street

All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours in 2027, and LOS D and v/c <1.0 during the AM and PM peak hours in 2032 and 2042.

4. Manono Street and Kekūanaō'a Street

All movements at the signalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during AM and PM peak hours in 2027 and 2032.

In 2042, the Eastbound through-right land resulted in poor LOS E conditions during PM peak hours with a v/c ratio of 0.97. All other movements at the intersection resulted in LOS D or better and v/c <1.0 during AM and PM peak hours.

5. Mililani Street and Kekūanaōʻa Street

All movements at the unsignalized intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours and LOS D or better and v/c <1.0 in 2032 and 2042.



Figure 53: 2027 Future Without Project Peak Hour Volumes

	AM			PM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS	
Hawaii Route 19 & Manono Street/Lihiwai Street	20.2	-	С	24.0	-	С	
Hawaii Route 19 EB Left	13.2	0.28	В	15.5	0.29	В	
Hawaii Route 19 EB Through	15.8	0.38	В	20.2	0.47	С	
Hawaii Route 19 EB Right	19.1	0.52	В	29.0	0.72	С	
Hawaii Route 19 WB Left	12.1	0.17	В	15.2	0.23	В	
Hawaii Route 19 WB Through	18.7	0.56	В	21.1	0.51	С	
Hawaii Route 19 WB Right	13.2	0.02	В	16.0	0.02	В	
Manono Street NB Left	26.6	0.62	С	27.8	0.73	С	
Manono Street NB Through-Right	25.4	0.36	С	22.2	0.22	С	
Lihiwai Street SB Left	26.8	0.08	С	27.9	0.08	С	
Lihiwai Street SB Through-Right	36.0	0.74	D	37.8	0.77	D	
Hawaii Route 11 & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)			
Hawaii Route 11 NB Left	20.8	0.52	С	21.7	0.40	С	
Hawaii Route 11 NB Through	-	-	-	-	-	-	
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-	
Piilani Street EB Left-Right	21.7	0.25	С	22.6	0.42	С	
Manono Street & Piilani Street	Unsignalized (TWSC)			Unsignalized (TWSC)			
Manono Street NB Left-Through-Right	8.1	0.01	Α	8.2	0.01	Α	
Manono Street SB Left-Through-Right	8.1	0.05	Α	8.2	0.07	Α	
Piilani Street EB Left-Through-Right	22.8	0.16	С	24.0	0.22	С	
Piilani Street WB Left-Through-Right	18.1	0.37	С	22.3	0.43	С	
Manono Street & Kekuanaoa Street	31.1	-	С	31.3	-	С	
Manono Street NB Left	21.3	0.25	С	19.8	0.15	В	
Manono Street NB Through-Right	31.8	0.65	С	26.9	0.50	С	
Manono Street SB Left	22.1	0.28	С	20.1	0.25	С	
Manono Street SB Through-Right	29.6	0.58	С	30.8	0.65	С	
Kekuanaoa Street EB Left	25.1	0.39	С	23.1	0.36	С	
Kekuanaoa Street EB Through-Right	28.0	0.58	С	40.1	0.83	D	
Kekuanaoa Street WB Left	18.1	0.08	В	25.8	0.40	С	
Kekuanaoa Street WB Through-Right	38.7	0.83	D	31.9	0.68	С	
Mililani Street & Kekuanaoa Street	Unsignalized (TWSC)			Unsignalized (TWSC)			
Mililani Street NB Left-Through-Right	24.0	0.15	С	16.9	0.08	С	
Mililani Street SB Left-Through-Right	18.3	0.16	С	13.1	0.12	В	
Kekuanaoa Street EB Left-Through-Right	8.9	0.02	Α	8.5	0.02	Α	
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	Α	8.7	0.00	Α	

## Table 8: 2027 Future LOS Conditions Without Project


Figure 54: 2032 Future Without Project Peak Hour Volumes

	AM			PM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS	
Hawaii Route 19 & Manono Street/Lihiwai Street	20.6	-	С	25.2	-	С	
Hawaii Route 19 EB Left	13.6	0.30	В	16.2	0.30	В	
Hawaii Route 19 EB Through	16.1	0.40	В	21.1	0.51	С	
Hawaii Route 19 EB Right	19.9	0.55	В	32.4	0.78	С	
Hawaii Route 19 WB Left	12.2	0.18	В	15.9	0.24	В	
Hawaii Route 19 WB Through	19.3	0.60	В	22.1	0.55	С	
Hawaii Route 19 WB Right	13.2	0.02	В	16.4	0.02	В	
Manono Street NB Left	28.3	0.67	С	27.6	0.74	С	
Manono Street NB Through-Right	25.4	0.36	С	21.9	0.22	С	
Lihiwai Street SB Left	26.8	0.08	С	28.3	0.08	С	
Lihiwai Street SB Through-Right	36.0	0.74	D	38.3	0.77	D	
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Hawaii Route 11 NB Left	22.6	0.55	С	24.0	0.43	С	
Hawaii Route 11 NB Through	-	-	-	-	-	-	
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-	
Piilani Street EB Left-Right	23.8	0.27	С	24.9	0.45	С	
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Manono Street NB Left-Through-Right	8.2	0.01	Α	8.3	0.01	А	
Manono Street SB Left-Through-Right	8.2	0.05	Α	8.2	0.07	Α	
Piilani Street EB Left-Through-Right	24.3	0.18	С	25.6	0.23	D	
Piilani Street WB Left-Through-Right	19.1	0.38	С	24.0	0.46	С	
Manono Street & Kekuanaoa Street	33.2	-	С	33.0	-	С	
Manono Street NB Left	21.7	0.27	С	21.1	0.17	С	
Manono Street NB Through-Right	33.1	0.69	С	28.6	0.54	С	
Manono Street SB Left	22.6	0.29	С	21.2	0.26	С	
Manono Street SB Through-Right	30.7	0.62	С	34.2	0.72	С	
Kekuanaoa Street EB Left	26.9	0.43	С	22.8	0.36	С	
Kekuanaoa Street EB Through-Right	29.3	0.63	С	42.2	0.86	D	
Kekuanaoa Street WB Left	18.5	0.09	В	26.5	0.42	С	
Kekuanaoa Street WB Through-Right	43.1	0.87	D	31.7	0.70	С	
Mililani Street & Kekuanaoa Street	Unsi	gnalized (TV	VSC)	) Unsignalized (TWSC)			
Mililani Street NB Left-Through-Right	26.0	0.16	D	17.9	0.09	С	
Mililani Street SB Left-Through-Right	40.4	0.47	6	12 E	0.12	В	
	19.4	0.17	Ľ	15.5	0.12		
Kekuanaoa Street EB Left-Through-Right	9.0	0.17	A	8.6	0.02	A	

# Table 9: 2032 Future LOS Conditions Without Project



Figure 55: 2042 Future Without Project Peak Hour Volumes

		AM		PM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS	
Hawaii Route 19 & Manono Street/Lihiwai Street	23.3	-	С	28.7	-	С	
Hawaii Route 19 EB Left	16.2	0.36	В	17.7	0.35	В	
Hawaii Route 19 EB Through	18.6	0.47	В	23.2	0.58	С	
Hawaii Route 19 EB Right	24.3	0.65	С	43.5	0.89	D	
Hawaii Route 19 WB Left	13.9	0.20	В	17.2	0.28	В	
Hawaii Route 19 WB Through	23.2	0.71	С	24.5	0.63	С	
Hawaii Route 19 WB Right	14.6	0.02	В	17.2	0.02	В	
Manono Street NB Left	27.7	0.68	С	29.6	0.78	С	
Manono Street NB Through-Right	24.4	0.32	С	21.9	0.21	С	
Lihiwai Street SB Left	28.1	0.09	С	29.5	0.08	С	
Lihiwai Street SB Through-Right	37.8	0.75	D	40.1	0.78	D	
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Hawaii Route 11 NB Left	28.3	0.63	D	30.8	0.51	D	
Hawaii Route 11 NB Through	-	-	-	-	-	-	
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-	
Piilani Street EB Left-Right	30.7	0.34	D	32.7	0.54	D	
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Manono Street NB Left-Through-Right	8.4	0.01	A	8.5	0.01	А	
Manono Street SB Left-Through-Right	8.3	0.05	A	8.4	0.07	А	
Piilani Street EB Left-Through-Right	28.1	0.20	D	30.9	0.27	D	
Piilani Street WB Left-Through-Right	21.9	0.43	С	29.7	0.53	D	
Manono Street & Kekuanaoa Street	39.3	-	D	40.4	-	D	
Manono Street NB Left	23.9	0.31	С	23.4	0.21	С	
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	С	
Manono Street SB Left	25.1	0.34	С	22.7	0.30	С	
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D	
Kekuanaoa Street EB Left	30.7	0.50	С	23.6	0.39	С	
Kekuanaoa Street EB Through-Right	31.3	0.71	С	56.7	0.97	E	
Kekuanaoa Street WB Left	18.7	0.10	В	31.6	0.52	С	
Kekuanaoa Street WB Through-Right	53.9	0.96	D	33.6	0.76	С	
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsignalized (TWSC)			
Mililani Street NB Left-Through-Right	32.2	0.20	D	20.4	0.11	С	
Mililani Street SB Left-Through-Right	22.5	0.20	С	14.5	0.14	В	
Kekuanaoa Street EB Left-Through-Right	9.3	0.02	Α	8.7	0.02	Α	
Kekuanaoa Street WB Left-Through-Right	8.6	0.01	A	9.1	0.01	А	

# Table 10: 2042 Future LOS Conditions Without Project

#### Future With Project Conditions

A. Project Related Volumes

The number of trips generated for the proposed project was determined using trip generation, trip distribution, modal choice, and route assignment.

B. Trip Generation and Distribution

Trip generation was calculated using rates from *Trip Generation*, 11<sup>th</sup> Edition (International Transportation of Engineers, 2021) appropriate for manufacturing and fast-food restaurants with a drive through window. **Table 11** outlines the projected trips generated from the proposed project.

Phase	Agency or Building	Land Use	Unite	ts Indonondont Voriable		AM Peak Hour			PM Peak Hour		
(Analysis Year)	Description	Code	Units	independent variable	In	Out	Total	In	Out	Total	
2024	Manufacturing	140	30	1000 Sq. Ft. GFA	21	7	28	3	6	9	
2024	Fast-Food Restaurant with Drive-Through Window	934	1.8	1000 Sq. Ft. GFA	41	39	80	30	29	59	
Trip Reduction (Fast-Food Restaurant with Drive-Through Window)					-	-	-	-16	-16	-32	
Totals					62	46	108	17	19	36	

#### Table 11: Project Related Development Phasing and Trips Generated

Total vehicular trips expected to be generated during AM and PM peak hours are 108 and 36, respectively. Additionally, the project related trips were distributed along the four (4) primary roadways in the surrounding area, including Hawai'i Route 19 and 11, Kekūanaō'a Street, and Manono Street. This distribution was based on data from the 2018 Highway Performance Monitoring System (HPMS) for Hawai'i Roads (**Table 12**). This data was chosen to reflect pre-Covid traffic patterns.

#### Table 12: 2018 HPMS Surrounding Roadway Volumes

HPMS 2018 GIS						
Hawaii Route 19 (at Manono)	16,800	25%				
Hawaii Route 11 (at Piilani)	24,900	38%				
Kekuanaoa Street (at Mililani and Kekuanaoa)	13,700	21%				
Manono Street (at Kekuanaoa)	10,300	16%				
Total	65,700	100%				
*Source: 2018 Highway Performance Monitoring System Roads for						
Hawaii GIS Database	Hawaii GIS Database					

# C. Future 2027, 2032 and 2042 With Project Peak Hour Conditions and LOS at Each Study Intersection (Figures 56-58 and Tables 13-15)

1. Hawai'i Route 19 and Manono Street/Lihiwai Street

All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours in 2027, 2032 and 2042.

2. Hawai'i Route 11 and Pi'ilani Street

All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours in 2027 and 2032.

In 2042, the Eastbound left-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.51). All other movements at this intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2042.

3. Manono Street and Pi'ilani Street

All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours in 2027.

In 2032, the Eastbound left-through-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.46). All other movements at this intersection resulted in appropriate LOS D or better and v/c <1.0 during the AM and PM peak hours in 2042.

4. Manono Street and Kekūanaō'a Street

All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours in 2027 and 2032.

In 2042, the Southbound left-through-right lane will operate poorly at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively). All other movements at this intersection resulted in appropriate LOS C or better and v/c <1.0 during the AM and PM peak hours in 2042.

5. Mililani Street and Kekūanaō'a Street

All movements at the unsignalized intersection resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours in 2027, 2032, and 2042.



Figure 56: 2027 Future with Project Peak Hour Volumes

AM				РМ				
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS		
Hawaii Route 19 & Manono Street/Lihiwai Street	20.4	-	С	24.3	-	С		
Hawaii Route 19 EB Left	13.2	0.28	В	15.7	0.29	В		
Hawaii Route 19 EB Through	15.9	0.38	В	20.5	0.47	С		
Hawaii Route 19 EB Right	19.7	0.54	В	29.8	0.74	С		
Hawaii Route 19 WB Left	12.1	0.18	В	15.5	0.23	В		
Hawaii Route 19 WB Through	18.7	0.56	В	21.4	0.51	С		
Hawaii Route 19 WB Right	13.2	0.02	В	16.2	0.02	В		
Manono Street NB Left	27.6	0.65	С	27.1	0.73	С		
Manono Street NB Through-Right	25.5	0.37	С	22.1	0.22	С		
Lihiwai Street SB Left	26.8	0.08	С	28.1	0.08	С		
Lihiwai Street SB Through-Right	36.0	0.74	D	38.1	0.77	D		
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)		
Hawaii Route 11 NB Left	22.6	0.57	С	22.2	0.41	С		
Hawaii Route 11 NB Through	-	-	-	-	-	-		
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-		
Piilani Street EB Left-Right	25.3	0.34	D	23.4	0.44	С		
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)		
Manono Street NB Left-Through-Right	8.3	0.03	Α	8.3	0.01	A		
Manono Street SB Left-Through-Right	8.1	0.05	Α	8.2	0.07	A		
Piilani Street EB Left-Through-Right	32.6	0.42	D	27.6	0.32	D		
Piilani Street WB Left-Through-Right	26.5	0.53	D	25.5	0.49	D		
Manono Street & Kekuanaoa Street	32.0	-	С	31.4	-	С		
Manono Street NB Left	20.7	0.25	С	19.9	0.15	В		
Manono Street NB Through-Right	30.9	0.65	С	27.0	0.50	С		
Manono Street SB Left	21.5	0.27	С	20.1	0.25	С		
Manono Street SB Through-Right	29.0	0.58	С	31.1	0.66	С		
Kekuanaoa Street EB Left	27.5	0.44	С	23.2	0.37	С		
Kekuanaoa Street EB Through-Right	29.3	0.60	С	40.1	0.83	D		
Kekuanaoa Street WB Left	18.8	0.08	В	25.8	0.40	С		
Kekuanaoa Street WB Through-Right	42.0	0.85	D	31.9	0.68	С		
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)		
Mililani Street NB Left-Through-Right	25.4	0.15	D	17.0	0.09	С		
Mililani Street SB Left-Through-Right	18.5	0.18	С	13.2	0.13	В		
Kekuanaoa Street EB Left-Through-Right	9.0	0.03	A	8.5	0.02	A		
Kekuanaoa Street WB Left-Through-Right	8.4	0.01	Α	8.7	0.00	A		

# Table 13: 2027 Future LOS Conditions With Project



Figure 57: 2032 Future With Project Peak Hour Volumes

	AM			PM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS	
Hawaii Route 19 & Manono Street/Lihiwai Street	21.3	-	С	25.4	-	С	
Hawaii Route 19 EB Left	14.1	0.31	В	16.4	0.31	В	
Hawaii Route 19 EB Through	16.8	0.41	В	21.4	0.51	С	
Hawaii Route 19 EB Right	21.2	0.58	С	33.3	0.79	С	
Hawaii Route 19 WB Left	12.7	0.19	В	16.0	0.25	В	
Hawaii Route 19 WB Through	20.0	0.61	В	22.3	0.55	С	
Hawaii Route 19 WB Right	13.7	0.02	В	16.6	0.02	В	
Manono Street NB Left	27.8	0.66	С	27.5	0.75	С	
Manono Street NB Through-Right	25.1	0.35	С	21.9	0.22	С	
Lihiwai Street SB Left	27.3	0.08	С	28.4	0.08	С	
Lihiwai Street SB Through-Right	36.6	0.75	D	38.6	0.77	D	
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Hawaii Route 11 NB Left	25.0	0.61	D	24.6	0.45	С	
Hawaii Route 11 NB Through	-	-	-	-	-	-	
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-	
Piilani Street EB Left-Right	30.2	0.40	D	25.9	0.48	D	
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Manono Street NB Left-Through-Right	8.3	0.03	А	8.3	0.01	A	
Manono Street SB Left-Through-Right	8.2	0.05	А	8.2	0.07	A	
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D	
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D	
Manono Street & Kekuanaoa Street	33.7	-	С	33.2	-	С	
Manono Street NB Left	22.1	0.27	С	21.2	0.17	С	
Manono Street NB Through-Right	33.9	0.71	С	28.7	0.55	С	
Manono Street SB Left	23.0	0.30	С	21.2	0.27	С	
Manono Street SB Through-Right	31.6	0.65	С	34.7	0.73	С	
Kekuanaoa Street EB Left	28.0	0.46	С	22.9	0.37	С	
Kekuanaoa Street EB Through-Right	29.3	0.63	С	42.4	0.87	D	
Kekuanaoa Street WB Left	18.5	0.09	В	26.5	0.42	С	
Kekuanaoa Street WB Through-Right	43.4	0.88	D	31.8	0.70	С	
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsi	ignalized (TV	VSC)	
Mililani Street NB Left-Through-Right	27.9	0.17	D	18.0	0.09	С	
Mililani Street SB Left-Through-Right	19.7	0.19	С	13.6	0.13	В	
Kekuanaoa Street EB Left-Through-Right	9.1	0.03	А	8.6	0.02	Α	
Kekuanaoa Street WB Left-Through-Right	8.5	0.01	Α	8.9	0.00	A	

# Table 14: 2032 Future LOS Conditions With Project



Figure 58: 2042 Future With Project Peak Hour Volumes

AM				РМ				
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS		
Hawaii Route 19 & Manono Street/Lihiwai Street	23.6	-	С	29.1	-	С		
Hawaii Route 19 EB Left	16.3	0.36	В	17.9	0.35	В		
Hawaii Route 19 EB Through	18.7	0.48	В	23.5	0.58	С		
Hawaii Route 19 EB Right	25.3	0.68	С	45.1	0.90	D		
Hawaii Route 19 WB Left	14.0	0.21	В	17.4	0.28	В		
Hawaii Route 19 WB Through	23.3	0.71	С	24.7	0.63	С		
Hawaii Route 19 WB Right	14.7	0.02	В	17.4	0.02	В		
Manono Street NB Left	28.7	0.70	С	29.4	0.78	С		
Manono Street NB Through-Right	24.4	0.33	С	21.9	0.21	С		
Lihiwai Street SB Left	28.1	0.09	С	29.7	0.08	С		
Lihiwai Street SB Through-Right	37.8	0.75	D	40.3	0.78	D		
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Uns	ignalized (TV	VSC)		
Hawaii Route 11 NB Left	32.3	0.69	D	31.7	0.53	D		
Hawaii Route 11 NB Through	-	-	-	-				
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-		
Piilani Street EB Left-Right	44.2	0.51	E	34.7	0.57	D		
Manono Street & Piilani Street	Unsi	gnalized (AV	VSC)	Unsignalized (AWSC)				
Manono Street NB Left-Through-Right	20.8	0.69	С	19.5	0.67	С		
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E		
Piilani Street EB Left-Through-Right	12.3	0.20	В	11.4	0.15	В		
Piilani Street WB Left-Through-Right	13.6	0.36	В	12.5	0.30	В		
Manono Street & Kekuanaoa Street	36.6	-	D	34.4	-	С		
Manono Street NB Left	24.4	0.32	С	23.6	0.21	С		
Manono Street NB Through-Right	40.9	0.81	D	31.7	0.63	С		
Manono Street SB Left	25.7	0.35	С	22.8	0.30	С		
Manono Street SB Through-Right	37.0	0.75	D	44.8	0.86	D		
Kekuanaoa Street EB Left	29.1	0.49	С	22.2	0.37	С		
Kekuanaoa Street EB Through	29.1	0.65	С	40.2	0.86	D		
Kekuanaoa Street EB Right	19.3	0.06	В	19.9	0.11	В		
Kekuanaoa Street WB Left	18.1	0.09	В	25.9	0.42	С		
Kekuanaoa Street WB Through	45.7	0.91	D	30.4	0.69	С		
Kekuanaoa Street WB Right	19.2	0.05	В	19.4	0.07	В		
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Uns	ignalized (TV	VSC)		
Mililani Street NB Left-Through-Right	34.7	0.21	D	20.6	0.11	С		
Mililani Street SB Left-Through-Right	22.9	0.22	С	14.5	0.14	В		
Kekuanaoa Street EB Left-Through-Right	9.4	0.03	A	8.8	0.02	А		
Kekuanaoa Street WB Left-Through-Right	8.7	0.01	Α	9.1	0.01	Α		

# Table 15: 2042 Future LOS Conditions With Project

#### Impacts and Mitigating Measures

The TIAR has three (3) main recommendations to mitigate traffic in the future with the proposed project based on projected traffic increases in 2032 and 2042.

Future 2032 With Project conditions suggest that the eastbound left-through-right lane at Manono Street and Pi'ilani Street will operate at LOS E during the AM peak hour, with a v/c ratio of 0.46. A traffic signal was analyzed at this intersection but did not pass the minimum volume thresholds outlined in the Manual on Uniform Traffic Control Devices (MUTCD). Alternatively, an All-Way Stop Control would result in acceptable LOS for all intersection movements during AM and PM peak hours. It is therefore recommended that an AWSC be constructed at the intersection of Manono Street and Pi'ilani Street by 2032.

Future 2042 With Project conditions suggest that southbound left-through-right lane at Manono Street and Pi'ilani Street will operate at LOS E during the AM and PM peak hours, with a v/c ratio of 0.89 and 0.94, respectively. This projection is likely even if an AWSC is constructed in 2032. A traffic signal alternative was analyzed but did not pass the minimum MUTCD volume thresholds. Alternatively, a mini-roundabout could be considered at this intersection. A mini-round about would have similar features to a standard roundabout in terms of efficiency, safety, and traffic calming, but could be implemented at a smaller intersection such as this one. However, peak hour volumes at this intersection in Future 2042 With Project conditions fall well below the FHWA capacity to merit a mini-roundabout. It is therefore recommended that this intersection is monitored in the future to determine the appropriate mitigating measures.

Future 2042 With Project conditions suggest that the eastbound left-right at Hawai'i Route 11 and Pi'ilani Street will operate at LOS E during the AM peak hour, with a v/c ratio of 0.51. However, the TIAR notes that all mainline movements along Hawai'i Route 11 will operate at appropriate LOS. Since the eastbound volume at the intersection is low, and the eastbound-left-right is not currently approaching capacity, no mitigation is recommended at this time.

The proposed action also includes the extension of Manono Street north along the west side of the parcel to County dedicable standards, which will incorporate the restaurant drive-through exit and an entrance/exit for delivery trucks and bottling plant workers. This will further mitigate traffic impacts to Pi'ilani Street by separating purposes of access to the subject site.

#### 3.3.2 Public Utilities and Services

#### Environmental Setting: Water

County water is available to the site via an existing six (6) inch waterline within Pi'ilani Street fronting the subject Property. The parcel is served by an existing 5/8-inch meter, which allows a maximum daily usage of 600 gallons. According to the Department of Water Supply (DWS), the existing six (6) inch waterline fronting Pi'ilani Street, and the existing eight (8) inch waterline within Manono Street are both inadequate to provide the required 2,000 gallons per minute flow for fire protection, as per DWS standards. Estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, will be submitted to DWS for review and approval. These calculations will include estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including

irrigation use. Based on the water demand calculations, the Department will determine the appropriate service lateral and meter size required to satisfy all water needs including fire suppression requirements.

The proposed zoning will require the installation of a reduced pressure type backflow prevention assembly, by a licensed contractor, within five (5) feet of the meter on the Property. If a larger or additional meter is required, a backflow prevention assembly will be installed for that meter. The installation of the backflow prevention assembly will be inspected and approved by DWS before commencement of water service. In the event other agencies require construction improvements within the road right-of-way fronting the Property, Hawaiian Kingdom Brands will be responsible for the relocation and adjustment of affected DWS water system facilities, should they be necessary.

The Department of Water Supply does not allow the use of County water for bottling and resale. Therefore, a new 1,000-foot-deep water well is proposed to serve the potable uses associated with the proposed water bottling and roasting plant.

#### Impacts and Mitigating Measures

Water efficient fixtures and practices will be installed and implemented throughout all proposed buildings and activities to reduce the demand on water resources. These include low flow systems and timed shut off for appropriate devices in all bathrooms and proposed kitchen areas, which will also reduce wastewater.

The Commission on Water Resource Management also recommends implementing appropriate landscaping irrigation conservation Best Management Practices endorsed by the Landscape Industry Council of Hawai'i. These include installation and maintenance BMPs.

Installation Best Management Practices:

- 1. Irrigation system plans and specifications should include post-construction documentation, including drawing of record (as-built drawings), maintenance recommendations, design precipitation rates and manufacturer's operational guide.
- 2. Design irrigation system with sprinklers spaced with head-to-head coverage or better.
- 3. Irrigate with a precipitation rate not exceeding soil infiltration rate.
- 4. Design systems to irrigate similar hydrozones such as slope, sun exposure, soil conditions, and plant materials with similar water use.
- 5. Use smart controllers.
- 6. Encourage the use of drip irrigation for individual specimen plants, shrubs, and trees during establishment period.
- 7. Use flow sensors with smart controllers to detect leaks or drastic changes in water use.
- 8. Use an irrigation submeter that measures water use on large sites.
- 9. Use water conservation irrigation components, such as rotary nozzles, pressure regulated spray heads and valves, rain switches, and high efficiency nozzles.
- 10. Sprinklers in low-lying areas and slopes should be equipped with check valves.

- 11. Incorporate Low Impact Development (LID) storm water design methods, including rain gardens, infiltration beds, rain barrels, swales, and basins, that allow water to collect and soak into the ground on site.
- 12. Preserve existing native trees and non-invasive vegetation where feasible during development and do not install irrigation in these areas.
- 13. Incorporate compost into soils at planting.
- 14. Encourage xeriscaping practices to include native and non-invasive ornamental plants.
- 15. Encourage the use of non-potable water for irrigation.
- 16. Use a qualified irrigation designer, irrigation supplier, landscape architect and installation contractor.

Maintenance Best Management Practices:

- 1. If not using a climate-based controller, manually manage controller run times and days to water according to soil conditions and seasonal weather conditions.
- 2. Program irrigation controller to encourage deep watering by using longer, less frequent watering times to improve deep rooting and increase drought resistance.
- 3. To reduce the amount of water evaporating from the soil surface, schedule night or early morning (5 p.m. to 9 a.m.) start times for established plantings. In areas where ponding, compaction, or runoff occurs, set 2-3 short run time cycles.
- 4. Mulch with wood chips around base of trees and shrub beds and refresh as necessary to maintain a minimum of two inches.
- 5. Allow grass to grow taller in summer months to conserve water and encourage deep rooting.
- 6. Aerate lawns when compaction occurs.
- 7. At a minimum, conduct a monthly inspection to verify system operation and correct deficiencies.
- 8. Conduct a practical water audit once every 2 to 5 years by a qualified irrigation professional.
- 9. Attend water conservation seminars and webinars including Board of Warer Supply, Landscape Architects, University of Hawai'i, EPA Water Sense, and the Irrigation Association.
- 10. Use a licensed maintenance contractor with water conservation expertise.

The proposed project will also participate in the Water Audit Program to monitor water usage data to further increase water efficiency in the water system. This will be done for both County water and water used from the proposed deep confined aquifer. CWRM also recommends coordination with the County to incorporate the proposed project into the Hawai'i County's Water Use and Development Plan.

#### Environmental Setting: Wastewater

The proposed project would require the extension of the County sewer line from its terminus near the intersection of Pi'ilani and Mililani Street. The line is proposed to be extended north from its terminus near Mililani Street and Pi'ilani Street to mitigate impacts to Pi'ilani Street (**Figure 59**). This extension would require a Sewer Extension Application and approval.



	Legend ×
	Public WWD web page10 4
	(G) Sewer System
	(G) Existing Sewer Lines
	Discharges
	Dedication Pending
	County of Hawaii (WWD)
	County of Hawaii (not WWD)
	Military
	D Private
	State
	Unknown
	Pump Stations
	Dedication Pending
	County of Hawaii (WWD)
	County of Hawaii (not WWD)
	Military
	PS Private
	PS State
	Unknown
	Plants
	WIR Dedication Pending
	County of Hawaii (WWD)
	County of Hawaii (not WWD)
	WTP Military
	WTP Private
	WTP State
	Unknown
779	Manholes
iilani St	County of Hawaii (WWD), Drop
	County of Hawaii (WWD), Flush Tank
	<ul> <li>County of Hawaii (WWD), Junction Box</li> <li>County of Hawaii (WWD), Old System</li> </ul>
	Junction Box
	<ul> <li>County of Hawaii (WWD), Plain</li> </ul>
	<ul> <li>County of Hawaii (WWD), Pressure</li> </ul>
	<ul> <li>County of Hawaii (WWD), Shallow Drop</li> </ul>
	<ul> <li>County of Hawaii (WWD), Tee</li> </ul>
	<ul> <li>County of Hawaii (WWD), Unknown</li> </ul>
	County of Hawaii (not WWD), Plain
	<ul> <li>County of Hawaii (not WWD), Shallow</li> <li>Drop</li> </ul>
	<ul> <li>Dedication Pending, Plain</li> </ul>
	Dedication Pending, Shallow Drop
	Private, Drop
	Private, Plain
	Private, Shallow Drop
	State, Drop
	State, Plain
	State, Shallow Drop
	Laterals
	<ul> <li>Dedication Pending</li> </ul>
rigure 59	<ul> <li>County of Hawaii (WWD)</li> </ul>
	<ul> <li>County of Hawaii (not WWD)</li> </ul>

The Department of Environmental Management (DEM) may require a sewer line study prior to connection to the County sewer system, which may advise sewer line or other facility improvements for mitigation of impacts of the proposed project. Hawai'i County Code Section 21-8 prohibits the discharge of unpolluted water into County sewers.

# Impacts and Mitigating Measures

The Hilo Wastewater Treatment Plant facility needs significant repairs to maintain long term functional operations. The proposed development would be a modest addition to the sewer from the proposed use. Efforts to minimize wastewater are reflected in the design of the project, including the use of water from the deep confined aquifer, which will be treated using nanofiltration and UV light disinfection. The proposed water source will require less treatment and wastewater than water from the county aquifer. Compressed air will be used to "rinse" bottles before they are filled to minimize water use and wastewater. Wastewater produced from coffee roasting activities is not expected to be significant. No unpolluted water will be discharged into the County sewer system.

# Environmental Setting: Electricity, Schools, Police, Fire, and Hospitals

Electricity will be provided by a Hawaiian Electric Light Company (HELCO) connection as well as solar panels.

The Hilo police and fire stations are just over 1.5 miles west of the subject site. The closest school is the Chiefess Kapi'olani Elementary School located roughly 1 mile west, on the other side of the Wailoa River/Waiākea Fishpond. The Hilo hospital, known as Hilo Medical Center, is located roughly 4 miles to the northwest.

#### Impacts and Mitigating Measures

There are no anticipated significant impacts to any public utilities or services. No adverse effect to medical, government, social service, or recreational services would occur. The Property is in proximity to the Hilo city center and nearby public services and utilities.

#### 3.4 Secondary and Cumulative Impacts

#### Secondary Impacts

1. Plastic Waste

The beverage bottling plant proposes to use glass bottles for all sales in the State of Hawai'i, and when possible, to non-local market sales. However, in the event of glass supply shortages, Hawaiian Kingdom Brands proposes to use recycled and carbon neutral plastic bottles to non-local markets. Significant supply shortages have been experienced globally in recent years due to various socioeconomic factors. It is therefore necessary to assess the potential secondary impacts of plastic waste in the event of a supply shortage.

Plastic waste has had a significant impact on the Hawaiian Islands through environmental and marine pollution, habitat destruction, biodiversity loss, climate change, and human health. The Hawaiian archipelago is especially at risk of accumulating marine debris from the 'Great Pacific Garbage Patch', which is in the North Pacific basin, and is estimated to be roughly the size of Texas. Ocean currents bring tens of tons of floating debris from the patch to the Hawaiian Islands every year. Some estimate up to 96 percent of this debris is plastic.

The Special Management Area of Hawai'i specifically sees impacts to sensitive ecosystems and wildlife, polluted beaches, reduced landfill capacity, and economic impacts to taxpayers. This is especially important for Hawai'i County. Prior to 2019, Business Services Hawai'i sorted and packaged plastic materials collected by Hawai'i County to be recycled off-island. However, in 2019 the company announced they were no longer able to afford to provide this service. Since then, Hawai'i County transfer stations have not accepted plastic waste for recycling purposes. Clean type 1 and 2 plastics for recycling and HI-5 beverage containers for redemption are still accepted at some private businesses. However, it often takes a separate trip to these facilities to properly discard plastic products, which deters many people. Most plastic in Hawai'i therefore ends up mixed with all other rubbish and ends up in landfills. This includes already recycled plastic bottles.

Hawaiian Kingdom Brands is not proposing to sell plastic bottles within the state at any time. When necessary, HKB intends to only use high quality recycled and carbon neutral plastic bottles during glass supply shortages to avoid furloughing employees if glass supply shortages occur. The number of potential plastic bottles to be used in the event of a supply shortage is currently unknown. It is recommended that estimates are determined and refined throughout the permitting process to ensure a significant impact from plastic waste does not occur.

Recycled and carbon neutral plastic bottles have many benefits including reduced waste, conservation of natural resources, and increased sustainability. Furthermore, recycled and carbon neutral plastic bottles appear to be one of the best alternative plastic products available today. If a more sustainable alternative becomes available on the market, such as biodegradable plastic bottles, then HKB will definitely consider its usage.

Additionally, Hawaiian Kingdom Brands intends to host company beach clean ups and promote educational programs that encourages recycling and responsible use of disposing plastic products.

2. Wastewater

The estimated wastewater produced from all proposed actions will be moderate and are not expected to cause significant impacts to the county sewer line or the Hilo Wastewater Treatment Plant. Efforts to minimize wastewater will be enforced at all times and revisited as operations develop. The development would provide positive impacts to the community through employment and by providing locally made consumer products to the rapidly growing population in the Hilo area.

# Cumulative Impacts

Cumulative impacts occur when the implementation of several projects, which have individually limited impacts, combine to produce more severe impacts. Draft Environmental Assessments published in the Environmental Notice between 2017 to present and Special Management Area permits were reviewed to assess potential cumulative impacts from other proposed developments in the area. One (1) planned development within 1 mile of the subject site was found to have potential cumulative impacts to the proposed action.

It is necessary to consider the potential cumulative impacts the Island Naturals retail and office complex development may have on the proposed action, particularly to traffic. However, the limited information available regarding the planned commercial complex makes it very difficult to predict or assess potential traffic impacts to the Hawaiian Kingdom Brands proposed action. SSFM states, "without a TIAR detailing more specific trip generation and distribution, future traffic volumes for this development cannot be accurately forecast and distributed as part of this report." See **Appendix D**, **Pages 22-23** for SSFM's full assessment.

# **3.5 Required Permits and Approvals**

The following permits and approvals are required for the proposed construction of a beverage bottling plant and café in the County of Hawai'i Special Management Area:

# County of Hawai'i:

- Special Management Area Use Permit
- Plan Approval
- Grading and Grubbing Permit
- Building Permits
- Time Extension for Rezone Ordinance 1992-122
- Sewer Extension Application

# State of Hawai'i:

- National Pollutant Discharge Elimination System (NPDES) Permit for construction related activities
- Storm Water Pollution Prevention Plan (SWPPP) Permit
- Possible Community Noise Permit for construction related activities and well operation
- Well Permit from the Commission on Water Resource Management (CWRM)
- Potential Pump Installation Permit
- Drinking Water Permit from the Department of Health Safe Drinking Water Branch

# 3.6 Consistency with Government Plans and Policies

# 3.6.1 Hawai'i County General Plan

The Hawai'i County General Plan serves as a guiding document for decision-making and the implementation of goals for Hawai'i Island. The plan was adopted in 1989 by ordinance and most recently revised in 2005. The General Plan uses the Land Use Pattern Allocation Guide (LUPAG) Map to designate land on Hawai'i Island for future developments. The LUPAG is a broad, flexible design tool to guide the direction and quality of future developments in a coordinated and manner. It indicates the general location of various land uses in relation to each other. The designation for the subject Property is Industrial. Due to the importance of the General Plan in determining the suitability of land-use projects and developments, the following goals, policies, and standards that align with the proposed action are discussed below:

# ECONOMIC GOALS

- a. Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
- b. Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawai'i.
- d. Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.
- e. Strive for an economic climate that provides its residents an opportunity for choice of occupation.
- f. Strive for diversification of the economy by strengthening existing industries and attracting new endeavors.
- g. Strive for full employment.
- h. Promote and develop the island of Hawai'i into a unique scientific and cultural model, where economic gains are in balance with social and physical amenities. Development should be reviewed on the basis of total impact on the residents of the County, not only in terms of immediate short run economic benefits.

**Discussion:** The proposed action would have a significant positive impact on the local economy. The proposed action would provide stable jobs in multiple fields of work during construction and operation. When fully operational it is estimated over 100 employees would need to be hired including servers, chefs, warehouse workers, and truck drivers. Producing local coffee and water products would provide an opportunity to offer more reasonable prices to the community. Products could also be exported instead of relying on imports, which could contribute to State and County taxes. The project would also establish an all Native-Hawaiian board to oversee company decisions and act as a visible reminder that the Hawaiian Kingdom exists. Overall, the proposed project would stimulate and support long-term economic stability and social development of Hawai'i Island.

# ENVIRONMENTAL QUALITY GOALS

- a. Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
- b. Maintain and, if feasible improve the existing environmental quality of the island.
- c. Control pollution.

# ENVIRONMENTAL QUALITY POLICIES

a. Take positive action to further maintain the quality of the environment.

#### ENVIRONMENTAL QUALITY STANDARDS

- a. Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well-being, through the enforcement of appropriate Federal, State and County standards.
- b. Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
- c. Federal and State environmental regulations shall be adhered to.

**Discussion:** The proposed action will not have a significant adverse impact to environmental quality or ecological systems. Any effect that may result will be minimized to the extent practicable and is clearly outweighed by public health, safety, welfare, and other compelling public interests, such as job creation, Native Hawaiian endorsement, and high-quality food and beverage. Regulations relating to site development and operation will safeguard the public health and well-being and ensure all potential environmental impacts are mitigated to the greatest extent possible.

#### FLOOD CONTROL AND DRAINAGE GOALS

- a. Protect human life.
- b. Prevent damage to man-made improvements.
- c. Control pollution.
- d. Prevent damage from inundation.
- e. Reduce surface water and sediment runoff.
- f. Maximize soil and water conservation.

#### FLOOD CONTROL AND DRAINAGE POLICIES

- a. Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
- d. Any development within the Federal Emergency Management Agency designated floodplain must be in compliance with Chapter 27.

g. Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

# FLOOD CONTROL AND DRAINAGE STANDARDS

- a. "Storm Drainage Standards," County of Hawai'i, October 1970, and as revised.
- b. Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai'i County Code.
- c. Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
- d. Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai'i County Code.
- e. Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

**Discussion:** The Property is in Flood Zone X, or outside the 500-year floodplain and is not expected to impact or be impacted by significant flooding or coastal hazards. Anticipated sea level rise of 3.2 feet, expected to occur as soon as 2060 by some experts, will have no impact on the subject Property. The proposed well would be specifically designed for rapid capping and sealing in the event a present-day tsunami is threatening the area. The proposed action would comply with all required codes and regulations regarding drainage and runoff mitigation. These protections will prevent any adverse impacts relating to flooding potential due to the proposed action.

# HISTORIC SITES GOALS

- a. Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.
- b. Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

# HISTORIC SITES POLICIES

- a. Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
- b. Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings, and objects.
- c. Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
- d. Public access to significant historic sites and objects shall be acquired, where appropriate.

**Discussion:** An Archeological Inventory Survey (AIS) conducted in 2018 determined the presence of one historical site on the subject Property. This site is identified as Site 50-10-35-1481.2. It is a concrete slab interpreted as a historic foundation or walkway, a remnant of

previous industrial uses on site, which is significant for yielding information for understanding historic activity in the area. The mapping, written descriptions, and photography of Site 1481.2 adequately document it and no further work or preservation has been recommended. The survey also found four 'displaced isolated objects' but they are not considered significant historical resources. The Property was recently cleared under SMA Minor Permit No. PL-SMM-2022-000012, which makes it unlikely for additional unknown historical or archaeological sites to be discovered. However, in the event undiscovered resources are identified on the Property during construction, work will cease, and the State Historic Preservation Division will be contacted for appropriate action.

# NATURAL BEAUTY GOALS

- a. Protect, preserve, and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
- b. Protect scenic vistas and view planes from becoming obstructed.
- c. Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

# NATURAL BEAUTY POLICIES

- a. Increase public pedestrian access opportunities to scenic places and vistas.
- b. Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

**Discussion:** The proposed development will have limited impacts on scenic resources. The proposed construction will not impose on views to or from any listed resource in the General Plan, including Wailoa River State Park, Mauna Kea, and Mauna Loa. During construction, appropriate fencing will be used to mitigate temporary impacts to scenic views, air quality, and noise. After construction, landscaping will be incorporated to screen the Property from Pi'ilani Street and Manono Street according to Industrial zoning standards.

#### NATURAL RESOURCES AND SHORELINES GOALS

- a. Protect and conserve the natural resources from undue exploitation, encroachment, and damage.
- b. Provide opportunities for recreation, economic, and educational needs without despoiling or endangering natural resources.
- c. Protect and promote the prudent use of Hawai'i's unique, fragile, and significant environmental and natural resources.
- d. Protect rare or endangered species and habitats native to Hawai'i.
- e. Protect and effectively manage Hawai'i's open space, watersheds, shoreline, and natural areas.
- f. Ensure that alterations to existing landforms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

# NATURAL RESOURCES AND SHORELINES POLICIES

- a. Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
- c. Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
- d. Protect the shoreline from the encroachment of man-made improvements and structures.
- h. Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
- p. Encourage the use of native plants for screening and landscaping.
- r. Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
- u. Ensure that activities authorized or funded by the County do not damage important natural resources.

**Discussion:** Estuarine habitats of the Wailoa River/Waiākea Fishpond/Hilo Bay area are not at risk of contamination or water loss. Water proposed to be withdrawn from the deep confined aquifer is in no way connected to the above Hilo Aquifer that support these systems. The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. No water will be withdrawn from the Hilo Aquifer under the proposed action therefore no impacts are expected to surface water levels, submarine habitats, or the local non-commercial fishery.

CWRM requires pump tests be performed for all new wells with a proposed pumping rate greater than 50 gallons per minute as part of the well permit application process. Data from these tests are used for an initial determination on the potential for the well to impact nearby streams, marshes, or other surface water bodies. If it is determined that a new well is likely to adversely impact a surface water body, CWRM may take several actions to mitigate impacts. However, this is outcome is not anticipated since the subject aquifer is deep confined and is not known to correlate to any surface water body.

The risk of surface contaminants entering any ground water source is low, arguably negligible since the well will be under significant artesian pressure. An Environmental Site Assessment also found no evidence of current or past contamination on the site that has the potential to leak into ground water sources during construction. Best Management Practices outlined in the SWPPP will prevent storm water runoff impacts to the well and surrounding sites. The Property will be connected to the county sewer line to handle wastewater. Construction Best Management Practices and mitigating measures to prevent storm water runoff are outlined in detail in Sections 3.1.1 and 3.1.4. The proposed well will be monitored 24 hours a day, seven days a week, and designed for rapid capping in the event of a tsunami, which will be outlined in the Well Permit, requiring CWRM and DOH approval.

Submarine discharge from the deep confined aquifer at roughly 1,200 feet below sea level is not expected to significantly decrease based on the proposed action. If we assume a SY of 10 MGD, withdrawing 200,000 gallons per day would only be 2 percent of this value. In contrast, if we

assume a SY of 100 MGD, a draw rate of 200,000 gallons per day would only account for 0.2 percent. In either case the proposed action will have negligible impact to the total discharge rate into the ocean at depth. Potential impacts to water loss, nutrients, and habitats located at depth will therefore not be significantly adverse.

There is no evidence of intermittent anchialine pools that form during high tides on the subject property, therefore no anticipated impact to the endemic shrimp *Halocaridina rubra*, commonly known as 'ōpae 'ula. A Jurisdictional Determination was requested from the U.S. Army Corps of Engineers to certify that no permanent or intermittent aquatic resources exist on site. However, their preliminary review of the site deemed a JD not required at this time as there is no reason to believe aquatic resources exist on site.

# LAND USE GOALS: INDUSTRIAL

- a. Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.
- b. Promote and encourage the rehabilitation of industrial areas that are serviced by basic community facilities and utilities.

# LAND USE POLICIES: INDUSTRIAL

- d. Improve the aesthetic quality of industrial sites and protect amenities of adjacent areas by requiring landscaping, open spaces, buffer zones, and design guidelines.
- e. Industrial areas shall be located in areas adequately served by transportation, utilities, and other essential infrastructure.
- g. Industrial-commercial mixed-use districts shall be provided in appropriate locations.
- h. Require developers to provide basic infrastructure necessary for development.

# LAND USE STANDARDS: INDUSTRIAL

- a. Industrial development shall maintain or improve the quality of the present environment.
- b. Industrial activities may be located close to raw materials or key resources.
- c. Topography of industrial land shall be reasonably level.
- d. Industrial development shall be conveniently located to its labor resource.
- e. The direction of wind patterns and the absence of Tradewinds shall be considered in the siting of industrial areas.

**Discussion:** The subject site is relatively level and adequate for industrial infrastructure. The subject site is serviced by adequate infrastructure. A County water line is already available, and the county sewer line will be extended north for wastewater. Fire and police services are available within 1 mile. Roadway improvements will ensure increased traffic is mitigated properly.

# 3.6.2 Hawai'i County Zoning and Special Management Area

The existing land use and proposed action complies with provisions and guidelines outlined in Chapter 205A, Hawai'i Revised Statues (HRS), Coastal Zone Management (CZM). The proposed action is also consistent with Action 16, Session Laws of Hawai'i (SLH) 2020, which amended the HRS Chapter 205A. The Planning Department noted in a letter dated July 7, 2022, that the Final Environmental Assessment (FEA) may be used as the application for the Special Management Area Major Use Permit, if it meets the application criteria in the Planning Commission Rule 9 and includes a thorough discussion section on the SMA criteria, in conformance with Planning Commission Rule 9-10(h), *Criteria of Substantial Adverse Effect*.

On September 15, 2020, Act 16 of the Session Laws of Hawai'i (SLH) amended the Hawai'i Revised Statues Chapter 205A related to coastal zone management. According to Senate Bill Number 2060, "The purpose of [Act 16] is to strengthen coastal zone management policy by amending Chapter 205A, Hawai'i Revised Statutes, to protect state beaches and to reduce residential exposure to coastal hazards."

The relevant amended sections of Chapter 205A and Act 16 to the proposed project include:

# Chapter 205A-2 Coastal Zone Management Program; Objectives and Policies

- b. Objectives
  - 1. Recreational resources;
    - a. Provide coastal recreational opportunities accessible to the public.
  - 2. Historic resources;
    - a. Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.
  - 3. Scenic and open space resources;
    - a. Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.
  - 4. Coastal ecosystems;
    - a. Protect valuable coastal ecosystems, including reefs, beaches, and coastal dunes, from disruption and minimize adverse impacts on all coastal ecosystems.
  - 5. Economic uses;
    - a. Provide public or private facilities and improvements important to the State's economy in suitable locations.
  - 6. Coastal hazards;
    - a. Reduce hazard to life and property from coastal hazards.
  - 7. Managing development;
    - a. Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
  - 8. Public participation;
    - a. Stimulate public awareness, education, and participation in coastal management.

- 9. Beach and coastal dune protection;
  - a. Protect beaches and coastal dunes for:
    - i. Public use and recreation;
    - ii. The benefit of coastal ecosystems; and
    - iii. Use as natural buffers against coastal hazards; and
- 10. Marine and coastal resources;
  - a. Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

*Discussion:* No significant impacts to any of the ten (10) objectives is anticipated. Recreation, scenic, and open space resources provided at Wailoa River State Park will not be impacted during construction or operation. One (1) historical site was identified on the Property, which was sufficiently documented. No further work on the site is recommended at this time. There are also no known archaeological or cultural resources on the site. In the event any undiscovered historical, archaeological, or cultural resources are identified during any stage of the proposed project, all work will cease at the State Historic Preservation Division will be contacted for appropriate action. Coastal hazards, beach and dune impacts are negligible since the site is not adjacent to ocean resources. Marine resources are not expected to be impacted significantly due to the nature of the proposed action, required permitting, Best Management Practices and mitigating measures.

#### c. Policies

- 1. Recreational resources
  - a. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
    - i. Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas.
    - Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value.

**Discussion:** The proposed improvements should not have any adverse impact to the recreational resources of the area. The site is located roughly 2,300 feet from the ocean, and 625 feet from Wailoa River State Park where the Wailoa River/Waiākea Fishpond is located. A vacant lot separates the parcel from the recreation area. Access to Wailoa State Park via Pi'ilani Street will not be impacted by the proposed action.

- 2. Historic resources
  - a. Identify and analyze significant archaeological resources
  - c. Support state goals for protection, restoration, interpretation, and display of historic resources

**Discussion:** The Archaeological Inventory Survey identified one site of historical significance, identified as Site 50-10-35-1481.2. It is a concrete slab interpreted as a historic foundation or walkway, a remnant of previous industrial uses on site. The site was adequately documented; no further work or preservation is recommended at this

time. The survey also found four 'displaced isolated objects' but they are not considered significant historical resources. In the unlikely event additional unknown historical, archaeological, or cultural resources are discovered on the Property, work will cease, and the State Historic Preservation Division will be contacted for appropriate action.

- 3. Scenic and open space resources
  - a. Identify valued scenic resources in the coastal zone management area.
  - b. Ensure that new developments are compatible with their visual environment by designing and locating those developments to minimize the alteration of natural landforms and existing public views to and along the shoreline.
  - c. Preserve, maintain, and where desirable, improve and restore shoreline open space and scenic resources.
  - d. Encourage those developments that are not coastal dependent to locate in inland areas.

**Discussion:** Wailoa River State Park is located roughly 625 feet to the west of the subject Property and is an open space resource. The park is not visible from the subject site as it is adjacent to an uncleared, vacant lot. The vegetation on the vacant lot is mostly tall trees, which obstructs visual impacts to and from the park to the subject site. Access and use of the park will not be impacted during construction or operation of the proposed action. Minimal and temporary impacts to noise and air quality may be experienced during construction, however, once operational, mitigating measures and Best Management Practices will ensure negligible impacts to noise and air quality in the park.

#### 4. Coastal ecosystems

- a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources
- c. Preserve valuable coastal ecosystems of significant biological or economic importance, including reefs, beaches, and dunes
- e. Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint sources water pollution control measures

**Discussion:** The proposed action should not generate any adverse impacts to coastal ecosystems. Wastewater will have negligible impacts to coastal resources as it will be handled through the County sewer system. The county sewer line will be extended north from its terminus near the Mililani and Pi'ilani Street intersection. A drainage system, mitigating measures, and BMPs will be established to control storm water runoff throughout the permitting process including the grading and grubbing permit, NPDES permit, and required drainage study. A Storm Water Pollution Prevention Plan has been prepared for this Environmental Assessment to outline site specific

BMPs before and after construction. The full report can be found in **Appendix B**. No additional storm water flows will be generated from the site under the proposed action. Offsite road work will also include drainage mitigation which could potentially improve conditions in the area with regards to storm water runoff.

Estuarine habitats of the Wailoa River/Waiākea Fishpond/Hilo Bay area are not at risk of contamination or water loss. Water proposed to be withdrawn from the deep confined aquifer is in no way connected to the above Hilo Aquifer that support these systems. The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. No water will be withdrawn from the Hilo Aquifer under the proposed action therefore no impacts are expected to surface water levels, submarine habitats, or the local non-commercial fishery. Pump tests reviewed by CWRM will confirm whether any impacts are anticipated and develop appropriate mitigating measures if necessary.

CWRM requires a pump test be performed for all new wells with a proposed pumping rate greater than 50 gallons per minute as part of the well permit application process. Data from these tests are used for an initial determination on the potential for the well to impact nearby streams, marshes, or other surface water bodies. If it is determined that a new well is likely to adversely impact a surface water body, CWRM may take several actions to mitigate impacts. However, this is outcome is not anticipated since the subject aquifer is deep confined and is not known to correlate to any surface water body.

Submarine discharge from the deep confined aquifer at roughly 1,200 feet below sea level is not expected to significantly decrease based on the proposed action. Potential impacts to water loss, nutrients, and habitats located at depth will therefore not be significantly adverse.

There is no evidence of intermittent anchialine pools that form during high tides on the subject property, therefore no anticipated impact to the endemic shrimp *Halocaridina rubra*, commonly known as 'ōpae 'ula.

- 5. Economic uses
  - a. Ensure that coastal dependent development and coastal related development are located, designed, and constructed to minimize exposure to coastal hazards and adverse social, visual, and environmental impacts in the coastal zone management area
  - b. Direct the location and expansion of coastal development to areas designated and used for that development and permit reasonable longterm growth at those areas, and permit coastal development outside of designated areas when:
    - i. Use of designated location is not feasible
    - ii. Adverse environmental effects and risks from coastal hazards are minimized; and
    - iii. The development is important to the State's economy

**Discussion:** The proposed development is not directly adjacent to a coastal area and is not considered a coastal dependent development. However, the site's proximity to Wailoa River/Waiākea Fishpond prompt an analysis of potentially adverse social, visual, and environmental impacts in the CZM area. Wailoa River State Park and subsequent water bodies will not be impacted during construction or operation. Minor and temporary impacts to scenic views, noise and air quality may be experienced during construction, but will be mitigated with BMPs during operation. There are no significant long-term impacts anticipated to any of these resources or the environment.

There are also no other alternative sites with industrial zoning that fit the needs and purpose of the proposed project. All potentially adverse environmental effects and risks from coastal hazards will be minimized to the greatest extent possible. The proposed action would have a very positive impact on the local and State economy. The proposed action would provide stable jobs in multiple fields of work during construction and operation. When fully operational it is estimated over 100 employees would need to be hired including servers, chefs, warehouse workers, and truck drivers. Producing local coffee and water products would provide an opportunity to offer more reasonable prices to the community. Products could also be exported instead of relying on imports, which could contribute to State and County taxes. The project would also establish an all Native-Hawaiian board to oversee company decisions and act as a visible reminder that the Hawaiian Kingdom exists. Overall, the proposed project would stimulate and support long-term economic stability and social development of Hawai'i Island.

- 6. Coastal hazards
  - a. Develop and communicate adequate information about the risk of coastal hazards
  - b. Control development, including planning and zoning control in areas subject to coastal hazards
  - c. Ensure that developments comply with requirements of the National Flood Insurance Program
  - d. Prevent coastal flooding from inland projects

**Discussion:** The Property is in Flood Zone X, or outside the 500-year floodplain and is not expected to impact or be impacted by significant flooding or coastal hazards. Anticipated sea level rise of 3.2 feet will have no impact on the subject Property. The proposed well would be specifically designed for rapid capping and sealing in the event of a present-day tsunami. The proposed action would comply with all required codes and regulations regarding drainage and runoff mitigation. These protections will prevent any adverse impacts relating to flooding potential due to the proposed action.

- 7. Managing development
  - a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development

c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process

**Discussion:** This Environmental Assessment is being written to determine and communicate the potential short and long-term impacts of the proposed project to the public and relevant agencies before any discretionary permit for the development is sought. If a Finding of No Significant Impact is granted for the proposed action, the required discretionary permits will be applied for. Some of these permits will require a Planning Commission hearing, which the public will be notified of.

- 8. Public participation
  - a. Promote public involvement in coastal zone management processes

**Discussion:** Several community meetings have been held to address questions and concerns of community members and to ensure public involvement and input is incorporated into the proposed development. When operational, a board made up of members from the Native Hawaiian community will work to ensure all aspects of the proposed development is in alignment with community interest and environmental benefit.

- 9. Beach protection
  - a. Prohibit construction of private shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities
  - e. Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor
  - f. Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor

*Discussion:* The subject Property is not adjacent to any beach. The proposed action will have no impact to beach processes, shoreline hardening, or prohibit beach access.

- 10. Marine and coastal resources
  - a. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial
  - d. Promote, research, study and understanding of ocean and coastal processes, impacts of climate change and sea level rise, marine life, and other ocean resources to acquire and inventory information necessary to understand how coastal development activities relate to and impact ocean and coastal resources

**Discussion:** The proposed action is not expected to impact any estuarine habitats or influence the water loss of surface water bodies in the area. Possible contamination of surface water bodies and ground water resources is very low and will be mitigated by Best Management Practices and conditions of required permits. The proposed action will not contribute to significant environmental destruction or climate change.

# **Chapter 205A-26 Special Management Area Guidelines**

- 1. All development in the special management area shall be subject to reasonable terms and conditions set by the authority in order to ensure:
  - A. Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;
  - B. Adequate and properly located public recreation areas and wildlife preserves are reserved;
  - C. Provisions are made for solid and liquid waste treatment, disposition, and management that will minimize adverse effects upon special management area resources;
  - D. Alterations to existing landforms and vegetation, except crops, and construction of structures shall case minimum adverse effect to water resources, beaches, coastal dunes, and scenic and recreational amenities and minimize impacts from floods, wind damage, storm surge, landslides, erosion, sea level rise, siltation, or failure in the event of earthquake.

**Discussion:** The proposed action will not impact existing landforms or adversely affect water resources. CWRM will review pump tests before a Well Permit is approved to ensure there will be no impacts to ground water resources, prevent saltwater upconing and excessive drawdown, to ensure a recharge boundary won't affect other resources and to keep the use significantly below the sustainable yield.

- 2. No development shall be approved unless the authority has first found:
  - A. That the development will not have any significant adverse environmental or ecological effect, except as any adverse effect is minimized to the extent practicable and clearly outweighed by public health, safety, or compelling public interests. Those adverse effects shall include but not be limited to the potential cumulative impact of individual developments, each of which taken by itself might not have a significant adverse effect, and the elimination of planning options;
  - B. That the development is consistent with the objectives, policies, and special management area guidelines of this chapter and any guidelines enacted by the legislature; and
  - C. That the development is consistent with the county general plan, community plan, and zoning; provided that a finding of consistency shall not preclude concurrent processing where a general plan, community plan, or zoning amendment may also be required.

**Discussion:** The proposed development is not expected to cause significant adverse environmental or ecological effect. Any potential impact will be mitigated by Best Management Practices and rules and regulations required for the relevant permit approvals. The public benefit to the proposed project is substantial, with the generation of 100 jobs, high quality beverage and food products, and the use of a community kitchen.

- 3. The authority shall seek to minimize, where reasonable:
  - A. Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough or lagoon;
  - B. Any development that would reduce the size of any beach or other area usable for public recreation;
  - C. Any development that would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions or rivers and streams within the special management areas and the mean high tide line where there is no beach;
  - D. Any development that would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast; and
  - E. Any development that would adversely affect water quality, existing areas of open water free to visible structures, existing and potential fisheries and fishing grounds, wildlife habitats, or potential or existing agricultural uses of land.

*Discussion:* Required pump tests reviewed by CWRM will determine appropriate pumping rates and more information on potential ground water discharge, which will determine and mitigate any potential impacts to estuary systems including Wailoa River and Waiākea Fishpond. No significant adverse impacts are expected to water quality, fishing grounds, or wildlife habitats. BMPs regarding wastewater and storm water runoff are established to manage impacts to the resources.

# 3.6.3 EnVision Downtown Hilo 2025

EnVision Downtown Hilo 2025 is a 'Community-Based Vision and Living Action Plan' that "serves as a guide for planning in Downtown Hilo and establishes the strategies and actions for creating an environment that is sustainable, livable, and attractive to its residents, workers, and visitors." The Hilo Bayfront Trails Planning project is an aspect of EnVision Downtown Hilo. It is a system of multi-use pathways along Hilo Bayfront from the Wailuku River to Hilo Harbor. The proposed action will not hinder the trail project in any way. Landscaping will be incorporated on the site to screen the bottling plant sufficiently. The café will be designed to be aesthetically pleasing and will provide a convenient location for park visitors to go to for high quality healthy products. Noise from the proposed project is not expected to significantly impact park visitors. Coffee roasting activities and the proposed well will be located within the warehouse/manufacturing plant with sufficient insulation to mitigate noise impacts to surrounding areas.

# 3.6.4 Water Rights

The State of Hawai'i has three (3) laws that make up the State's water rights:

- 1. The Public Trust Doctrine
- 2. The State Water Code
  - a. Commission on Water Resource Management
  - b. Hawai'i Water Plan and the Water Resource Protection Plan Update 2019
- 3. Correlative Rights Doctrine

Each law, impacts, and mitigating measures will be discussed in detail below.

# 3.6.4.1 Hawai'i Constitutional Public Trust Doctrine

The Hawai'i Intermediate Court of Appeals' (ICA) decision in *Kaua'i Springs, Inc. v. Planning Commission of the County of Kaua'i*, dated April 30, 2013, requires decision makers to specifically consider an applicant's use of public trust resources pursuant to Article XI, Section 1 of the Hawai'i Constitution.

The Hawai'i Constitution enacted the Public Trust Doctrine (PTD) in 1978 as Article XI, Chapter 11. Chapter 11, Section 7 of the PTD specifically addresses water resources. The law states, "The State has an obligation to protect, control, and regulate the use of Hawai'i's water resources for the benefit of its people." The Public Trust Doctrine is further defined in the following relevant case notes:

- 1. Although the Public Trust Doctrine and the State Water Code share similar core principles, the code does not supplant the protections of the Public Trust Doctrine.
- 2. The maintenance of waters in their natural state constitutes a distinct "use" under the water resource trust.
- 3. The rule of correlative rights applies to all ground waters of the State.
- 4. The state water resource trust embodies the following fundamental principles: the State has both the authority and duty to preserve the rights of present and future generations in the waters of the State; and the State bears an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible.
- 5. Under this section, Article XI, 1 of the Hawai'i Constitution and the Sovereign Reservation, the Public Trust Doctrine applies to all water resources, unlimited by any surface-ground distinction.
- 6. Pursuant to this section and Chapter 1 of the Hawai'i Constitution, Chapter 220 (d) of the Hawaiian Homes Commission Act, and Chapter 174C-101 (a), a reservation of water constitutes a public trust purpose.

Although seemingly straight forward, the Public Trust Doctrine remains a convoluted issue in the State of Hawai'i. Historically, cases that have brought the Public Trust Doctrine into question have reached the Hawai'i Supreme Court, who has taken on the burden of interpreting the doctrine on a case-by-case basis.

In 2001, a symposium was held in Hawai'i to try to better understand how the Public Trust Doctrine should be interpreted based on past cases that reached the Hawai'i Supreme Court. It was suggested during this symposium that the Public Trust Doctrine could be interpreted to have eight (8) fundamental principles:

- 1. To provide enduring protection of certain precious natural resources in Hawai'i for the benefit of not only all people but for the benefit of future generations.
- 2. The State of Hawai'i is the trustee of the public trust resources with all of the duties that go with the notion of being a trustee.
- 3. The public trust doctrine is a powerful property right of its own that in most circumstances takes precedence over other property rights whether they are private property rights or governmental property rights.
- 4. The Public Trust Doctrine requires principled public and rational planning processes concerning the use and potential destruction of public trust resources.
- 5. The burden is squarely placed on those who seek to use the public trust resources to prove that there will be no significant harm to the public resource. The burden is higher in the case of private commercial uses.
- 6. The precautionary principle when scientific data and analysis is simply inadequate to assess the potential damage to resources from requested uses, that lack of science should not be used as a basis to permit the use, the degradation, or the destruction of the public trust resource. The precautionary principle should apply to protect resources when the harm from use or consumptive activity cannot be measured with some degree of confidence.
- 7. The Public Trust Doctrine closely mirrors native Hawaiian and native American notions of stewardship of natural resources and the relationship between human beings and those resources.
- 8. The Public Trust Doctrine evolves based on current and future community needs.

More Recently, the ICA decision in *Kaua'i Springs, Inc. v. Planning Commission of the County of Kaua'i*, specifically addressed the duties of agencies and applicant's when proposed to use public trust resources. According to the landmark decision, the ICA stated, "To assist agencies in the application of the Public Trust Doctrine, we distill from our prior cases the following principles:

- a. The agency's duty and authority is to maintain the purity and flow of our waters for future generations and to assure that the waters of our land are put to reasonable and beneficial use.
- b. The agency must determine whether the proposed use is consistent with the trust purposes:
  - i. The maintenance of waters in their natural state;
  - ii. The protection of domestic water use;
  - iii. The protection of water in the exercise of Native Hawaiian and traditional and customary rights; and
  - iv. The reservation of water enumerated by the State Water Code.

- c. The agency is to apply a presumption in favor of public use, access, enjoyment, and resource protection.
- d. The agency should evaluate each proposal for use on a case-by-case basis, recognizing that there can be no vested rights in the use of public water.
- e. If the requested use is private or commercial, the agency should apply a high level of scrutiny.
- f. The agency should evaluate the proposed use under a "reasonable and beneficial use" standard, which requires examination of the proposed use in relation to other public and private uses."

"Applicants have the burden to justify the proposed water use in light of the trust purposes:

- a. Permit applications must demonstrate their actual needs and the propriety of draining water from public streams to satisfy those needs. *Waiāhole I, 94 Hawai'I at 162, 9 P.3d at 474*.
- b. If there is a reasonable allegation of harm to public trust purposes, then the applicant must demonstrate that there is no harm in fact or that the requested use is nevertheless reasonable and beneficial. *Kukui (Molokai), Inc., 116 Hawai'i at 499, 174 P.3d at 338.*
- c. The applicant is "obligated to demonstrate affirmatively that the proposed use will not affect a protected use, in other words, the absence of evidence that the proposed use would affect [a protected use] [is] insufficient[.]" *Wai 'ola O Moloka 'I, 103 Hawai 'I at 442, 83 P.3d at 705.*
- d. The applicant must demonstrate the absence of a practicable alternative water source. *Waiāhole I, 94 Hawaiʻi at 161, 9 P.3d at 473.*
- e. If the impact is found to be reasonable and beneficial, then in light of the cumulative impact of existing and proposed diversions on trust purposes, the applicant must implement reasonable measures to mitigate this impact. *Waiāhole I, 94 Hawai'i at 143, 161, 9 P.3d at 455, 473.*"

# Impacts and Mitigating Measures

The Public Trust Doctrine does not prohibit use of water for commercial and/or industrial use. However, the doctrine does state that use of water must be assessed for reasonable and beneficial use with a higher level of scrutiny for private commercial uses.

The proposed action is a reasonable-beneficial use. The projected withdraw of 200,000 gallons per day will account for a negligible amount of the subject aquifer's Sustainable Yield. This will not restrict or impair any water resource.

The project is expected to provide up to 100 job opportunities when fully operational and will establish an all Native-Hawaiian board to oversee company decisions. Part of the project's mission is to be a visible reminder that the Hawaiian Kingdom exists. The proposed withdraw from the deep confined subject aquifer will also have no impact to the Department of Hawaiian Home Lands' water reservations. The action is therefore reasonable and beneficial to the socioeconomic health of Hilo and the Native Hawaiian community.
According to David Callies, a professor at the University of Hawai'i Manoa School of Law, "The public trust doctrine does not require pristine and absolute preservation. Instead, the public trust doctrine requires a balancing process between protection and conservation of public resources, on the one hand, and the development and utilization of these resources, on the other. The public trust doctrine contemplates a balancing of private and public uses, and not the elimination of one at the expense of the other. In other words, a public trust doctrine resource does not foreclose private uses" (DLNR, 2019).

The proposed project is therefore consistent with the Public Trust Doctrine due to the absence of adverse impacts to water resources and benefits of the project to the public and native Hawaiian community.

#### 3.6.4.2 Hawai'i State Water Code

Article XI, Chapter 11, Section 7 of the Public Trust Doctrine states, "The legislature shall provide for a water resource agency which, as provided by law, shall set overall water conservation, quality and use policies; define beneficial and reasonable uses; protect ground and surface water resources, watersheds, and natural stream environments; establish criteria for water use priorities while assuring appurtenant rights and existing correlative and riparian uses and establish procedures for regulating all uses of Hawai'i's water resources."

The State Legislature passed the State Water Code, Hawai'i Revised Statutes, Chapter 174C, in 1987, which reflects traditional values and respect for Hawai'i's water resources as part of the Public Trust. "The code seeks to balance maximum beneficial use for commercial and domestic uses with adequate protections for traditional and customary Hawaiian rights, fish and wildlife, scenic beauty, and public uses" (HRS §174C-2c). The State Water Code called for the establishment of the Commission on Water Resource Management (CWRM) to oversee the administration of the code and subsequent administrative rules. CWRM is now the primary trustee of the water resources trust in the State of Hawai'i.

#### Commission on Water Resource Management

The Commission on Water Resource Management only recognizes nine (9) Aquifer System Areas on the Island of Hawai'i. There are two (2) relevant to the subject site: Hilo Aquifer (80401) and Onomea Aquifer (80204). These are the unconfined basal aquifers located above the deep confined subject aquifer. Under the State Water Code, <u>water use</u> of the recognized Aquifer System Areas is only regulated by CWRM when the water has been <u>designated</u> as a "Water Management Area" (WMA). In the State of Hawai'i, O'ahu is entirely designated as a WMA and Maui and Moloka'i are partially designated. In contrast, Hawai'i Island is not designated at all (**Figure 60**). According to CWRM, "When the water resources of an area are determined to be threatened by existing or proposed withdrawals of water, CWRM shall designate the area as a Water Management Area. A WMA establishes greater administrative control over the withdrawals and diversions of ground and surface waters to ensure reasonable-beneficial use of the water resources in the public interest while protecting those resources." The east side of Hawai'i Island has yet to show any indication of water shortage within its ground water resources and therefore lacks reasoning to become designated any time soon.



Although CWRM does not fully regulate water use within Hawai'i County, the agency still upholds their duty to protect water resources in accordance with its public trust responsibilities by regulating land use policies.

The Hawai'i Water Plan was created by CWRM with an objective to "serve as a dynamic, longrange planning guide for the Commission" to ultimately answer the question: How will our land use policies impact our freshwater resources? (County of Hawai'i, 2010).

The Hawai'i Water Plan consists of five (5) parts (Figure 61):

- 1. The Water Resource Protection Plan (WRPP)
- 2. The Water Quality Plan
- 3. The State Water Projects Plan
- 4. The Agricultural Water Use and Development Plan
- 5. The County Water Use and Development Plans (WUDP)



Figure 61: Graph of the State of Hawai'i Water Plan

#### Water Resource Protection Plan (WRPP)

The Water Resource Protection Plan (WRPP) is the component of the Hawai'i Water Plan that seeks "to protect and sustain statewide ground and surface water resources, watersheds, and natural stream environments" (CWRM, 2019).

The WRPP 2019 update includes thirteen (13) guiding policies:

- 1. The Public Trust Doctrine: The Title to water resources is held in trust by the State for the benefit of its people.
- 2. The State recognizes four public trust purposes:
  - a. Maintenance of waters in their natural state;
  - b. Domestic water use of the general public, particularly drinking water;
  - c. The exercise of Native Hawaiian traditional and customary rights; and
  - d. Reservations of water for Hawaiian Homelands.
- 3. The Precautionary Principle: The State has a duty to take anticipatory action to prevent harm to public resources.
- 4. Apply adaptive management principles in the face of scientific uncertainty.
- 5. The State Water Code shall be liberally interpreted.
- 6. The State Water Code shall be applied in a manner that conforms to the intentions and land use of the Counties.
- 7. Comprehensive water resources planning is needed for proper management and protection of the resource.
- 8. High standards of water quality shall be maintained.
- 9. Provide for public interest objectives while seeking to obtain maximum reasonable and beneficial use of waters of the state.
- 10. Quality of the water source should be matched to the quality of the water needed.
- 11. If there is a practical alternative water source available, that alternative source should be used in lieu of natural supplies.
- 12. Water use should be efficient, and waste of water is disallowed.
- 13. Appurtenant rights shall be assured.

The Hawai'i County Water Use and Development Plan (WUDP) is the component of the Hawai'i Water Plan that seeks "to set forth the allocation of water to land use through the development of policies and strategies which shall guide the County in its planning, management, and development of water resources to meet projected demands" (DWS, 2010).

CWRM does not recognize the deep confined subject aquifer as an Aquifer System Area, which means it does not have an established Sustainable Yield and is not incorporated into the WUDP land use policies. Since the proposed well would withdraw from Mauna Kea lavas, CWRM may consider the subject aquifer to be part of the Onomea Aquifer System, which has a sustainable yield of 147 MGD. Current foreseeable use of ground water from this aquifer system is less than five (5) MGD. The applicant's projected draw of 200,000 gallons per day (0.20 MGD) would represent less than 0.2 percent of the Sustainable Yield of the Onomea Aquifer. In contrast, if the Sustainable Yield of the Hilo Aquifer (349 MGD) is applied, then a projected draw of 200,000 gallons per day would represent less than 0.06 percent of the SY.

As discussed in Section 3.1.2 above, implementing the SY of the Hilo or Onomea Aquifer System is not entirely appropriate, as there is scientific evidence to suggest this aquifer and the deep confined subject aquifer are entirely different systems. However, until CWRM recognizes deep aquifers as separate systems, we are left to best apply what is recognized today.

#### Impacts and Mitigating Measures

The proposed action is consistent with the State Water Code and guiding principles of the WRPP.

Water from the proposed source will be used as efficiently as possible. There is no practical alternative water source available, as the high quality of water is required to produce the healthiest products and minimize water use and wastewater. Water management will be closely monitored in coordination with CWRM. Hawaiian Kingdom Brands will report the monthly water use for the potable well to meet the requirements consistent with the WRPP (2019).

The proposed action also meets all seven (7) conditions of Chapter 174C-49 of the State Water Code for new well permits:

- a. To obtain a permit pursuant to this part, the applicant shall establish that the proposed use of water:
  - 1. Can be accommodated with the available water source;
  - 2. Is a reasonable-beneficial use as defined in section 174C-3;
  - 3. Will not interfere with any existing legal use of water;
  - 4. Is consistent with the public trust;
  - 5. Is consistent with state and county general plans and land use designations;
  - 6. Is consistent with county land use plans and policies;
  - 7. Will not interfere with the rights of the department of Hawaiian home lands as provided in section 221 of the Hawaiian Homes Commission Act.
- c. The common law of the State to the contrary notwithstanding, the commission shall allow the holder of a use permit to transport and use surface or ground water beyond overlying land or outside the watershed from which it is taken if the commission determines that such transport and use are consistent with the public interest and the general plans and land use policies of the State and counties.

The proposed action is a reasonable-beneficial use. The projected withdraw of 200,000 gallons per day will account for a negligible amount of the subject aquifer's potential Sustainable Yield. The project is expected to provide up to 100 job opportunities when fully operational and will establish an all Native-Hawaiian board to oversee company decisions. The action is therefore reasonable and also beneficial to the socioeconomic health of Hilo. Furthermore, all appurtenant rights will be assured. The proposed withdraw from the deep confined subject aquifer will have no impact to the Department of Hawaiian Home Lands' water reservations.

#### 3.6.4.3 Correlative Rights Doctrine

The Correlative Rights Doctrine states that all landowners that overly a given aquifer have equal rights to use the ground water present in that source. Water may be withdrawn to the extent that it does not produce actual harm to the water rights of other users. Correlative rights allow the transfer of water to other users, so long as such use does not interfere with the use of other overlying parties (Pilson, 2017).

#### Impacts and Mitigating Measures

The proposed deep well will not interfere with the ability of other landowners to use the same ground water resource in the future. The estimated Sustainable Yield of the deep confined aquifer based on scientific data collected during the HSDP is substantial. The SY could yield between 10 MGD and 100 MGD of water use (2 or 0.2 percent of the SY, respectively). If the Onomea Aquifer SY of 147 MGD is applied to the subject aquifer, the projected withdraw rate of 200,000 gallons per day (0.2 MGD) would represent less than 0.2 percent. Additionally, if the Hilo Aquifer SY of 349 MGD is applied, the pumping rate The proposed action is therefore consistent with the Correlative Rights Doctrine.

#### **3.6.5** Conservation District

The project area does not reside in the State Land Use Conservation District. The designated State Land Use is *Urban*, which will remain unchanged by the proposed action.

#### PART 4: DETERMINATION, FINDINGS, AND REASONS

#### 4.1 Determination

The applicant expects that the County of Hawai'i Planning Department will determine that the proposed action will not significantly alter the environment and will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be based on comments to the Draft Environmental Assessment (DEA). The Final Environmental Assessment (FEA) will outline the final determination.

#### 4.2 Findings and Supporting Reasons

Agencies must consider several factors to determine whether an action has significant effects, as outlined in Chapter 11-200.1 of the Hawai'i Administrative Rules (HAR). The following factors evaluate the sum of effects of the proposed action on the quality of the environment by considering every phase of a proposed action, the expected impacts, and the proposed mitigating measures:

1. The proposed project will not involve an irrevocable commitment or loss or destruction of any natural, cultural, or historic resource.

The proposed action will not involve an irrevocable commitment or loss or destruction of any natural, cultural, or historic resources.

The proposed deep water well and projected draw of 200,000 gallons per day will not restrict or impair any water resource. The proposed well will not significantly reduce water availability or contaminate any surface or ground water resource. There are no anticipated impacts to estuarine habitats, the local non-commercial fishery, nor intermittent anchialine pools that may support endemic species. The proposed well will exclusively draw from the freshwater zone within the deep confined aquifer and will be encased in concrete to prevent the mixing of water in shallower aquifer systems.

Mitigating measures and Best Management Practices will adequately prevent significant impacts to all water resources from surface activities, wastewater, and storm water runoff. The proposed action will not impact the Sustainable Yield of any basal aquifer and will not significantly deplete the deep confined subject aquifer.

There are no anticipated impacts to any historical, archaeological, or cultural resources, including traditional and customary rights. Historic Site 50-10-35-1481.2 found during the archaeological survey has been adequately documented and does not require any further work or preservation. In the event any of these resources has the potential to be impacted, work on the project will cease, and the State Historic Preservation Division will be contacted immediately for appropriate action.

#### 2. The proposed project will not curtail the range of beneficial uses of the environment.

No restriction of beneficial uses of the environment would occur under the proposed action. The subject Property is not currently known to be utilized for traditional or customary rights. The site has been previously cleared several times, most recently in April 2022 under SMA Permit No. PL-SMM-2022-000012. If any cultural resources or traditional and customary right practices are discovered on the site, all work will cease, and the State Historic Preservation Department will be contacted for appropriate action.

3. The proposed project will not conflict with the State's environmental policies or longterm environmental goals established by law.

The State's long-term environmental policies are set forth in Hawai'i Revised Statues (HRS) Chapter 344. The broad goals of this policy are to conserve natural resources and enhance quality of life. The proposed action will not have a significant impact to environmental processes, nor will it negatively impact quality of life. Any potential impact to the environment can be mitigating by Best Management Practices and following County and State laws, rules, and regulations. The project would provide employment opportunity for up to 100 people when fully operational, would support local farmers, and be a convenient resource for high quality products.

4. The proposed project will not have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.

The project would have a very substantial positive impact on economic welfare and social welfare by providing up to 100 jobs for residents when fully operational. The project will also incorporate an all-Native Hawaiian board to assist in the decision making and trajectory of the company. The café kitchen will be available for community use outside of café open hours. Interested community members will be able to sign up to schedule time in the kitchen for a small fee. No fee will apply to non-profit organizations and native Hawaiians. The community kitchen will not support food trucks and will not host community events or classes.

There are no anticipated impacts to any historical, archaeological, or cultural resources, including traditional and customary rights. In the event any of these resources has the potential to be impacted, work on the project will cease, and the State Historic Preservation Division will be contacted immediately for appropriate action.

#### 5. The proposed project will not have a substantial adverse effect on public health.

The proposed action will not have a substantial effect on public health. Minor and shortterm impacts to air quality and noise levels may occur during construction but will be mitigated by using Best Management Practices and permitting when appropriate. Wastewater will be connected to the County sewer line. Storm water runoff will be mitigated by following County and State rules and regulations, and the development of a Storm water Prevention Plan, if necessary. The proposed project would produce some of the highest quality water and coffee products, which has inherent health benefits. The water from the subject aquifer is expected to be of very high quality and will be treated with nanofiltration and UV sterilization. If the water complies with the Department of Health's (DOH) standards for drinking water, then the well will be completed for production. However, if the water quality falls below expectations and extensive nanofiltration and UV sterilization is necessary, the project may not move forward due to financial feasibility concerns.

6. The proposed project will not involve adverse secondary impacts, such as population changes or effects on public facilities.

The proposed action will not produce any major secondary impacts to population changes or public facilities. The proposed project will provide job opportunities for a growing community and act as a visible reminder that the Hawaiian Kingdom exists. All products will be made with local products, which will have a positive secondary impact to local farmers as well.

7. The proposed project will not involve a substantial degradation of environmental quality.

The requested action would not contribute to substantial degradation of environmental quality. The proposed well will not use any hazardous materials that have the potential to contaminate ground water resources. The risk of surface contaminants entering any ground water source is low, arguably negligible since the well will be under significant artesian pressure. BMPs and mitigating measures will be strictly followed during the construction phases of the site and the well to prevent any impacts to water resources during this time. An Environmental Site Assessment also found no evidence of current or past contamination on the site that has the potential to leak into ground water sources during construction. The proposed well borehole will be encased in concrete which will prevent any potential leaks from the deep confined aquifer into the above basal aquifer. The well will also be designed to withdraw exclusively from the freshwater zone within the deep confined aquifer. Pump tests and mitigating measured outlined by CWRM will ensure no saltwater upconing occurs.

Wastewater from the proposed action does not pose a risk to any ground water resource. The subject site will be connected to the County sewer line and the project will incorporate wastewater management practices. Best Management Practices will be strictly followed during construction activities to manage storm water runoff.

The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. No water will be withdrawn from the Hilo Aquifer under the proposed action therefore no impacts are expected to surface water levels, submarine habitats, or the local non-commercial fishery. Pump tests will be reviewed by CWRM before the Well Permit is approved to ensure there are no impacts to nearby surface water bodies and near-surface estuarine habitats.

Submarine discharge from the deep confined aquifer at roughly 1,200 feet below sea level is not expected to significantly decrease based on the proposed action. Potential impacts to water loss, nutrients, and habitats located at depth will therefore not be significantly adverse.

There are no anticipated impacts to flora and fauna. No threatened or endangered species were detected during the biotic survey. One native species Kauna'oa Kahakai (*Cuscuta sandwichiana*) was located on the property but was not rooted in the ground. *Cuscuta sandwichiana* is a parasitic vine and requires a host plant to survive. Best Management Practices and mitigating measures to prevent impacts to native fauna that could utilize resources near the subject Property will be strictly followed.

Air pollutants during construction will be limited and temporary and will be controlled by Best Management Practices and mitigating measures. Measures to control airborne, visible fugitive dust from road areas outlined in the DOH Clean Air Branch will be strictly followed. Vehicular and truck trips generated by the proposed project are not expected to contribute to a significant decline in air quality. Exhaust from coffee roasting activities will follow all County and State regulations, including the use of ventilation systems according to Chapter 11-48 of the Hawai'i Administrative Rules. All exhaust will be pumped vertically into the air to avoid settling in low lying areas.

The proposed action will not produce significant greenhouse gas emissions. The main source of emissions from the proposed project are vehicular traffic, off-island shipments, and exhaust from coffee roasting. This activity is therefore not anticipated to contribute to a significant increase to GHG emissions. The proposed action will also not use an excessive amount of energy. Electricity will be sourced from HELCO and solar panels to maximize the use of renewable resources available at the subject site.

Glass bottles are proposed to be used for local market sales and recycled carbon neutral plastic bottles for non-local market sales in the event of supply shortages. The number of potential plastic bottles to be used in the event of a supply shortage is currently unknown. It is recommended that estimates are determined and refined throughout the permitting process to ensure a significant impact from plastic waste does not occur.

No hazardous materials are proposed to be used or stored on the property under the proposed action.

8. The proposed project is not one which is individually limited and will not have substantial adverse effect upon the environment or involve a commitment for larger actions.

The proposed action will not have substantial adverse effect upon the environment or involve a commitment for larger actions. Mitigating measures and Best Management Practices will be strictly followed during construction to minimize potential impacts to air and water quality. There are no long-term impacts expected to water quality or the surrounding environment. The proposed action is not expected to have significant impacts to natural resources, recreation, cultural, archaeological, or historical resources. The proposed well will be monitored 24/7 and will be designed for rapid capping in the event of a tsunami. Emergency services are located within one (1) mile of the subject site.

Miilani Street will be extended north to the west side of the parcel to dedicable County standards at the expense of the applicant. Future traffic impacts can be mitigated at the intersection of Pi'ilani and Manono Street with an all-way stop or mini roundabout depending on conditions in 2032 and 2042.

9. The proposed project will not have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.

A biotic survey of the Properties found no rare, threatened, or endangered species. One native plant known as Kauna'oa Kahakai (*Cuscuta sandwichiana*) was also detected, although it was not rooted in the ground. The remainder of the property is comprised on non-native trees, shrubs, and grasses. All rules and regulations regarding the potential of native or endangered fauna, which may utilize resources near the subject site will be strictly followed. Best Management Practices to minimize the movement of plant or soil material possibly contaminated with ROD or Little Fire Ants will also be implemented during construction and operation.

10. The proposed project will not have a substantial adverse effect on air or water quality or ambient noise levels.

The proposed action would have minimal and short-term effects on air quality and ambient noise levels during construction. Mitigating measures will be strictly followed to reduce impacts to both air quality and noise during the construction phase, including a possible noise permit. If maximum permissible levels of dust are exceeded, the contractor will consult with the Department of Health and determine whether a permit is necessary. Exhaust from coffee roasting activities will follow all County and State regulations, including the use of ventilation systems according to Chapter 11-48 of the Hawai'i Administrative Rules. All exhaust will be pumped vertically into the air to avoid settling in low lying areas.

Operation activities on site are not expected to exceed 70 decibels during daytime or nighttime hours. This includes noise generated onsite from the café, the beverage bottling plant, coffee roasting, and well operations. Onsite noise is not expected to impact nearby properties or Wailoa River State Park. If it is determined that a lower decibel maximum is appropriate for the area (for example, Commercial level standards), then further mitigating measures will be applied.

The Storm Water Pollution Prevention Plan will mitigate any potential impacts to water quality from construction activities on site.

11. The proposed project will not have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The Property is in Lava Zone 3 and has the same volcanic/seismic activity risk as much of Hilo. All buildings, and the proposed well, would be designed according to State and County code to withstand acceptable levels of seismic activity.

The Property is in Flood Zone X, or outside the 500-year floodplain and is not expected to impact or be impacted by significant flooding or coastal hazards. Anticipated sea level rise of 3.2 feet will have no impact on the subject Property. The proposed well would be specifically designed for rapid capping and sealing in the event a present-day tsunami is threatening the area. The proposed action would comply with all required codes and regulations regarding drainage and runoff mitigation. These protections will prevent any adverse impacts relating to flooding potential due to the proposed action.

There are no anticipated impacts to estuarine habitats, the local non-commercial fishery, nor intermittent anchialine pools that may support endemic species. The proposed action does not involve any activities that would alter existing stream channels, wetlands, or other surface water bodies. Pump tests reviewed by CWRM will confirm whether any impacts are anticipated and develop appropriate mitigating measures if necessary. Contamination is not a risk for any surface or ground water resource from the proposed action.

Submarine discharge from the deep confined aquifer at roughly 1,200 feet below sea level is not expected to significantly decrease based on the proposed action. Potential impacts to water loss, nutrients, and habitats located at depth will therefore not be significantly adverse.

12. The proposed project will not have a substantial adverse effect on scenic vistas and view planes, during day or night, identified in County or State plans or studies.

The proposed development will have limited impacts on scenic resources. The proposed construction will not impose on views to or from any listed resource in the General Plan,

including Wailoa River State Park, Mauna Kea, and Mauna Loa. During construction, appropriate fencing will be used to mitigate temporary impacts to scenic views, air quality, and noise. After construction, landscaping will be incorporated to screen the Property from Pi'ilani Street and Manono Street according to Industrial zoning standards. The café will be designed to be aesthetically pleasing and will also incorporate appropriate landscaping.

# 13. The proposed project will not require substantial energy consumption or emit substantial greenhouse gases.

The proposed action will not require substantial energy consumption or emit substantial greenhouse gases. Electricity will be sourced from a HELCO connection and solar panels. The proposed potable well is expected to be under artesian pressure, thus will likely not require a pump, which would use additional energy. The proposed potable water well will also significantly reduce County water needs. However, water saving methods will still be incorporated into each proposed building to conserve water and energy use. Such methods include utilizing energy efficient appliances such as fridges, and dishwashers, and low flow systems in bathrooms for toilets and sinks with timed shut off for appropriate devices.

Greenhouse gas emissions will be temporary and minor during the construction phase. When operational, the main source of emissions will be from transportation, including vehicle trips from café customers, truck deliveries and pickups, and shipping across the Pacific Ocean. These emissions are not expected to be significantly adverse. Although the percent of products sold in local vs. non-local sales is unknown, non-local sales are not expected to require a significant number of weekly shipping trips.

The processing of coffee and the restaurant kitchen are also expected to emit some exhaust. These emissions will be consistent with all County and State regulations, including the use of ventilation systems according to Chapter 11-48 of the Hawai'i Administrative Rules.

#### REFERENCES

Board of Water Supply (BWS). 2022. Hawai'i's Water Cycle. Retrieved from: https://www.boardofwatersupply.com/water-resources/the-water-cycle.

Chinen, J.J. 1961. Original Land Title in Hawaii. Published privately in Honolulu, Hawaii.

County of Hawai'i, Department of Water Supply. 2010. Hawai'i County Water Use and Development Plan Update. *Hawai'i Water Plan, Final Report.* 

Commission on Water Resource Management. 2019. Water Resource Protection Plan Update. *Hawai'i Water Plan*, State of Hawai'i.

Commission on Water Resource Management (CWRM). 2019a. Water Resource Protection Plan Update (WRPP) Appendix F. *Hawai'i Water Plan*, State of Hawai'i.

Department of Health. 2019. Arsenic in Waiāeka Pond: Ecological and Human Concerns. State of Hawai'i. Retrieved from: https://health.hawaii.gov/heer/files/2019/12/Waiakea-Pond-Study-Fact-Sheet-Aug-2019.pdf.

Department of Land and Natural Resources. 2019. *Professor David Callies Testimony*. Retrieved from: https://dlnr.hawaii.gov/occl/files/2019/08/TMT-DO-15-public-trust-doctrine.pdf.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. *Bull. Amer. Meteor. Soc.* 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

Handy, E.S.C., and E.G. Handy. 1972. Native Planters in Old Hawai'i: Their Life, Lore, and Environment. *B.P. Bishop Museum Bulletin* 233. Bishop Museum Press, Honolulu.

Hawai'i County Planning Department. 2005. The General Plan, County of Hawai'i. Hilo.

Hawai'i Ground Water & Geothermal Resources Center (HGGRC). 2018. Humu'ula Ground water Research Project: Project Info. University of Hawai'i at Mānoa. Retrieved from: https://www.higp.hawaii.edu/hggrc/projects/humuula-ground water-research-project/project-info/.

Hawai'i Office of Planning. 2006. Low Impact Development: A Practitioner's Guide. Coastal Zone Management, pursuant to National Oceanic and Atmospheric Administration Award No. NA03NOS4190082.

Hawai'i State Department of Health, Clean Water Branch. (2022). State of Hawai'i Water Quality Monitoring and Assessment Report: Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress Pursuant to Section 303(d) and 305(b), Clean Water Act (P.L. 97-117). Final. Honolulu, Hawai'i.

Hawai'i State Department of Land and Natural Resources (DLNR). 2017. *Rapid 'Ōhi'a Death: Part I: Strategic Response Plan for Hawai'i, 2017-2019.* Prep. by Division of Forestry & Wildlife. Honolulu.

Hawaiian Volcano Observatory (HVO). 2022. Frequently Asked Questions about Mauna Loa Volcano. United States Geological Survey (USGS). Retrieved from: https://www.usgs.gov/observatories/hawaiian-volcano-observatory/frequently-asked-questions-about-mauna-loa-volcano.

Kodama, K. 2022. Monthly Precipitation Summary, State of Hawai'i, August 2022. The National Weather Service, National Oceanic and Atmospheric Administration. Retrieved from: https://www.weather.gov/hfo/hydro\_summary.

Kamakau, S.M. 1992. Ruling Chiefs of Hawaii. Kamehameha Schools Press, Honolulu.

Keener, V.W., Marra, J.J., Finucane M.L., Spooner, D., & Smith, M.H. (Eds.). (2012). Climate Change and Pacific Islands: Indicators and Impacts. Report for the 2012 Pacific Islands Regional Climate Assessment (PIRCA). Washington, D.C.: Island Press.

Kelly, J., Dulai, H., Glenn, C., & Lucey, P. 2018. Integration of aerial infrared thermography and in situ radon-222 to investigate submarine ground water discharge to Pearl Harbor, Hawai'i, USA.

Kelly, M., B. Nakamura, and Dorothy Barrére. 1981. *A Chronological History, Land and Water Use in the Hilo Bay Area, Island of Hawai'i.* Honolulu: Bishop Museum Press.

Maly, K. 1996a. Appendix In: "Archaeological Assessment Study Hilo Judiciary Complex Project, Lands of Wainaku, Pōnohawai, Pi'ihonua, and Waiākea, South Hilo District, Island of Hawai'i (TMK: 2-6-15:1,2; 2-6-16:2; 2-4-49:18,19; 2-2-15:33; 2-4-1:12)." Paul H. Rosendahl, Inc., Hilo. PHRI Report 1721-061496. Prepared for State of Hawai'i, Honolulu.

National Ocean Service. 2021. What are the trade winds? National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Retrieved from: https://oceanservice.noaa.gov/facts/tradewinds.html.

Pilson, S. 2017. Hawai'i Water Law Overview. Water Resources Branch. Retrieved from: https://winapps.umt.edu/winapps/media2/wilderness/toolboxes/documents/water-rights/Hawaii%20Water%20Law%20Overview.pdf.

Pukui, M.K., Elbert, S.H., and E.T. Mookini. 1976. *Place Names of Hawaii*. Honolulu: University of Hawai'i Press.

Stopler, E., DePaolo, D., & Thomas, D. 2009. Deep Drilling into a Mantle Plume Volcano: The Hawai'i Scientific Drilling Project. Doi:10.2204/iodp.sd.7.02.2009.

Thomas, D. 2019. Mauna Kea Hydrology Presentation. Retrieved from: https://www.bigisland videonews.com/2019/09/30/video-mauna-kea-hydrology-presented-by-dr-don-thomas/.

Thomas, D. 2018. New Insights into the Ground water Hydrology of Mauna Kea and Hawai'i Island. Mauna Kea Speaker Series: A Monthly Scholar-Focused Presentation in Partnership with Office of Mauna Kea Management, 'Imiloa Astronomy Center and the University of Hawai'i Hilo Department of Physics and Astronomy. Retrieved from: https://www.youtube.com/watch?v=tbfa0MpGnuw&t=6s.

Thomas, D.M., Paillet, F.L., & Conrad M.E. 1996. Hydrogeology of the Hawai'i Scientific Driling Project borehole KP-1. Ground water geochemistry and regional flow patterns. Journal of Geophysical Research, Vol. 101, No. B5, Pages 11,683-11,694.

Trusdell, F.A., and Lockwood, J.P., 2017, Geologic map of the northeast flank of Mauna Loa volcano, Island of Hawai'i, Hawaii: U.S. Geological Survey Scientific Investigations Map 2932-A, pamphlet 25 p., 2 sheets, scale 1:50,000, https//doi.org/10.3133/sim2932A.

Wolfe, E., Wise, W., and Dalrymple, B. 1997. The geology and petrology of Mauna Kea volcano, Hawai'i – A study of post shield volcanism. United States Geological Survey Professional Paper 1557.

## DRAFT ENVIRONMENTAL ASSESSMENT

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

Appendix A Environmental Site Assessment

# PHASE I ENVIRONMENTAL SITE ASSESSMENT

525 Piilani Streeet Hilo, Hawaii 96720 Tax Map Key Parcel (3) 2-2-033:011

March 2018

Prepared by: Lehua Environmental Inc. P.O. Box 1018 Kamuela, Hawaii 96743

Prepared for: Columbus East, LLC. 2571 Lemon Road Honolulu, Hawaii 96815

SMAA Exhibit B

# **Table of Contents**

Table of	f Contentsi
List of A	Acronymsiii
Executiv	ve Summaryv
Section	1 Introduction
Section	2 Site Description
Тор	bography and Surface Water Flow
Geo	blogy3
Gro	oundwater
2.1	1 Wells and Drinking Water Sources
2.2	Historic Land Use
Ae	rial Photographs and Topographic Maps5
2.2	1 Sanborn Fire Insurance Maps
2.2	2 Tax Records
2.3	Previous Environmental Reports
Section	3 User Provided Information 7
Section	4 Records Review
4.1	Federal NPL Site List
4.2	Federal Delisted NPL Site List
4.3	Federal CERCLIS List
4.4	Federal CERCLIS NFRAP Site List
4.5	Federal RCRA CORRACTS Facilities List
4.6	Federal RCRA non-CORRACTS TSD Facilities List
4.7	Federal RCRA Generators List
4.8	Federal Institutional Controls/Engineering Controls Registries
4.9	Federal ERNS List
4.10	DOH SHWS11
4.11	State Landfill and/or Solid Waste Disposal Site Lists
4.12	State Leaking Underground Storage Tank Lists
4.13	State Registered Underground Storage Tank Lists
4.14	State Institutional Control/Engineering Control Registries
4.15	State Voluntary Cleanup Sites
4.16	State Brownfields Sites

#### Phase I Environmental Site Assessment TMK Parcel (3) 2-2-033:011 Hilo, Hawaii 96720

4.17	State Land Records
4.18	Records of Emergency Release Reports
4.19	Other Ascertainable Records
4.20	EDR Proprietary Records
Section 5	5 Current/Historical Use 15
Section 6	5 Site Reconnaissance 17
6.1.	USTs, Aboveground Storage Tanks (ASTs), Oil/Water Separators, Pipelines 17
6.1.2	2 Drains
6.1.3	Indication of Polychlorinated Biphenyl (PCB) Containing Materials
6.1.4	4 Mercury
6.1.	5 Chlorofluorocarbons (CFCs)
6.1.0	5 Stains and Chemical Odors
6.1.7	7 Adjacent Properties
Section 7	7 Data Gaps
Section 8	Conclusions and Opinions 19
Section 9	D Limitations
Section 1	0 References

### Figures

Figure 1: Location Map		
Figure 2: Project Site Layout Ma	p4	

### Appendices

Appendix A:PhotographsAppendix B:EDR Database Search

# List of Acronyms

%	percent
ASTM	American Society for Testing and Materials
AUL	activity and use limitation
CERCLIS	Comprehensive Environmental Response, Compensation,
	and Liability Information System
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CORRACTS	Corrective action report
DLNR	State of Hawai'i Department of Land and Natural Resources
DOH	State of Hawai'i Department of Health
DOT	Department of Transportation
EDR	Environmental Data Resources, Inc.
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Environmental Site Assessment
ft	feet
HCC	Hawaii County Code
HEER	Hazard Evaluation and Emergency Response
LEI	Lehua Environmental Inc.
LUST	leaking underground storage tank
Ма	millions of years ago
mi	miles
mg/L	milligrams per liter
msl	mean sea level
N/A	Not available
NFA	no further action
NFRAP	No Further Remedial Action Planned
NPDES	National Pollutant Discharge Elimination System
NPL	National Priority List
NRCS	Natural Resource Conservation Service
PCB	
RURA	Resource Conservation and Recovery Act
REC	recognized environmental condition
SHVVS	State Hazardous waste Site
	tax map key
150	treatment, storage, and disposal
	underground injection control
0363	United States Geological Survey
U.S.	
051	underground storage tank

This page is intentionally left blank.

# **Executive Summary**

This report presents the results of the Phase I Environmental Site Assessment (ESA) performed by Lehua Environmental Inc. (LEI) for the Tax Map Key (TMK) Parcel located at 525 Piilani Street Hilo, Hawaii 96720: (3) 2-2-033: 011 (hereinafter referred to as the Site). The Site is currently unused undeveloped vacant land. The Site occupies approximately 2.57 acres of land located in Hilo, Hawai'i on the island of Hawaii.

This assessment and report have been performed in general accordance with the United States Environmental Protection Agency (EPA) "All Appropriate Inquiry" (40 Code of Federal Regulations (CFR) Part 312), as well as the American Society for Testing and Materials (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (ASTM, 2013).

This assessment was conducted to evaluate existing conditions, investigate the environmental history, and identify the presence of recognized environmental conditions (RECs) within and around the Site. A REC is defined as *"the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."* (ASTM, 2013).

Research consisted of a review of historical and regulatory records, present conditions, site geology and hydrogeology.

This assessment has not revealed evidence of a current REC and has not revealed evidence of any historical RECs in connection with the Site. A historical REC is defined as "a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted residential use criteria established by a regulatory authority, without subjecting the property to any required controls" (ASTM, 2013).

This assessment has not revealed evidence of a historical or current REC in connection with the Site.

#### **De Minimis Items of Concern**

• Abandoned tires and trash was observed at the Site. These materials should be properly disposed.

#### **Data Gaps**

• In performing this Phase I ESA, no data gaps were identified.

# **Section 1 Introduction**

This report presents the results of the Phase I ESA of the Site located in Hilo, Hawai'i on the eastern side of the island of Hawaii (Figure 1). The property is denoted by TMK: (3) 2-2-033: 011.

The purpose of this assessment was to evaluate the presence of RECs at and surrounding the Site. The assessment of the Site has been performed by qualified environmental professionals as defined by, and in general accordance, with the EPA "All Appropriate Inquiry" (40 CFR Part 312), as well as the ASTM E 1527-013. This Phase I ESA includes a review of relevant geology and hydrogeology, federal, state, and local databases of known or potential hazardous waste sites, landfills, and sites currently under investigation for environmental violations within the ASTM recommended search distance of the Site. It also includes a site inspection and interviews with applicable persons that have knowledge of the site to check for evidence of RECs.



Figure 1: Location Map

This page is intentionally left blank.

## **Section 2 Site Description**

The Site is currently unused vacant land (Figure 2). The Site is bordered to the north, east and west by undeveloped land, and is bordered by residential and commercial properties to the south. According to Chapter 25 of the Hawaii County Code (HCC), the Site is zoned for Industrial use (HCC, 2005).

#### Topography and Surface Water Flow

The topography of the Site is flat at an elevation of approximately 11-13 feet above msl. The topography directs surface flow towards the west. The Site is approximately 590 feet east of Waiakea Pond, which is contiguous with Hilo Bay and the Pacific Ocean.

#### Geology

Published geologic and hydrogeologic reports and maps were reviewed to obtain available information regarding subsurface conditions in the general area of the Site.

The Island of Hawaii comprises five coalesced shield volcanoes: Kohala, Mauna Kea, Hualalai, Mauna Loa, and Kilauea. The Site is located near the east coast below Mauna Kea Volcano.

The Mauna Kea Volcano has passed through the primitive shield-building stage into the late stage and produced a cap of differentiated lavas that almost completely buried the original shield above sea level. The rocks have been divided into an older Hamakua Volcanic Series and a younger Laupahoehoe Volcanic Series with the former becoming further divided into upper and lower members. The top of Mauna Kea consists almost wholly of flows of the Laupahoehoe Series. Rocks of the Hamakua Series are exposed only in Waikahaluu and Pohakuloa gulches on the south flank of the mountain and in another, smaller gulch three kilometers farther west. These volcanic series are covered by a layer of Pahala ash in some areas that reach a thickness of seven and one-half meters along the Wailuku River above Hilo, but gradually thin northward to about two meters towards Paauilo (Macdonald et al., 1983).

#### Soil

Soils in the Site area include Keaukaha muck, characterized as Class D soil, with very slow infiltration rates. These soils are clayey, have a high water table, or are shallow to an impervious layer (Environmental Data Resources, Inc. (EDR), 2018).

Phase I Environmental Site Assessment TMK Parcel (3) 2-2-033:011 Hilo, Hawaii 96720

Figure 2: Project Site Layout Map



#### Groundwater

According to Mink and Lau (1990), the entire Site is located above one aquifer, status code 80401111(11111). This type of aquifer is basal (fresh water in contact with salt water), unconfined (where the water table is the upper surface of saturated aquifer), and composed of horizontally extensive (i.e. flank type) geological units (Mink and Lau, 1990). This aquifer is currently used as a drinking water source, is fresh (< 250 milligrams per liter (mg/L) chloride), irreplaceable, and is highly vulnerable to contamination (Mink and Lau, 1990).

Groundwater resources in the area are listed as being in the Northeast Mauna Loa aquifer system of the Hilo aquifer sector. The groundwater gradient in the vicinity of the Site is likely to the northwest towards Waiakea Pond. Annual average rainfall for the Site area is approximately 160 inches (Giambelluca et al., 2013).

#### 2.1.1 Wells and Drinking Water Sources

The Site is located approximately 0.45 miles seaward (*makai*) of the underground injection control (UIC) line. The UIC line was established by the State of Hawai'i Department of Health (DOH) to protect groundwater resources. Groundwater *mauka* of the UIC line is considered a potential drinking water source. Groundwater seaward (*makai*) of the UIC line is considered as non-potable and saline. Injection wells are prohibited *mauka* of the UIC line.

Results of the EDR report indicated no wells directly on the Site. The EDR also retrieved records for 15 wells within a distance of 1.0 mi to the nearest Site boundary. The wells are used for geothermal power exploration and aquifer research (USGS).

## 2.2 Historic Land Use

The County of Hawaii Planning Department website was examined for review of building permits for the Site and adjacent properties. Permit records are examined in order to identify any associated RECs. Permit records for the Site indicated that a warehouse was demolished at the Site in 1993 and previous tenants of the warehouse included a wood crafts company and Hawaiian Sun Inc. No building permits found represent a REC for the Site (COH, 2017).

#### Aerial Photographs and Topographic Maps

Past land use was evaluated by reviewing historical topographic maps and photos. Representative documents were selected to show the evolution of the Site and the surrounding area.

The years available with aerial photographs of the Site are 1954, 1975, 1977, 1985, 1988, 1992, and 2000. The earliest available aerial photograph, from 1954, shows one large warehouse and one small warehouse at the Site. The area surrounding the Site was lightly developed with residential, commercial/industrial uses to the south and northeast. Hoolulu Park was located to the east. The 1975-1992 photos depict further density of commercial/industrial use in the surrounding area. The 2000 photo shows the disappearance of the two warehouses previously located at the Site that were demolished in 1993 (EDR, 2018).

Topographic maps of the Site available were published during the years 1914, 1917, 1932, 1963, 1980, 1981,1995 and 2013. The 1914 topographic map depicts concentrated development south of the Site, as well as the presence of a railroad track along the current alignment of the Mamalahoa Highway to the east of the Site. The Waiakea Sugar Mill is located approximately 0.4 miles southwest of the Site. The presence of a former sugar mill may suggest the former use of pesticides and other hazardous materials. However, given the distance from the former mill to the Site, and since the mill site has been redeveloped, it is not likely to have impacted the Site. A 1932 topographic map depicts increased development around the Site, as well as the Hilo Airport to the east of the Site. The 1963 topographic map shows increased development. The 1981 and 1995 topographic maps depict increased density development in Hilo town around the Site (EDR, 2018).

#### 2.2.1 Sanborn Fire Insurance Maps

Past land use for the Site was also evaluated using Sanborn Maps for the following years: 1921, 1957, 1974, 1978, 1987 and 1991 (Appendix B). The Site is just off the mapped areas in all Sanborn Maps found. The 1921-1991 maps show increased residential and light commercial development south of the Site (EDR, 2018).

#### 2.2.2 Tax Records

Records from the County of Hawaii Real Property Tax Department were reviewed for the Site to assess the chain of title to determine historical uses that may indicate RECs. Tax records show that the Site was used as a commercial goods storage and distribution warehouse since at least 1948, and that the former large warehouse was built and used by the US military in 1942. No information found in the tax records researched reveals a REC for the Site.

### 2.3 Previous Environmental Reports

No previous environmental reports were found for the Site.

## **Section 3 User Provided Information**

ASTM E1527-13 outlines the responsibilities of the user (i.e., the user of this Phase I ESA report, in context of completing a Phase I ESA). A user is defined as *the party seeking* to use the Phase I ESA to complete an ESA of a property. A user may include a potential purchaser of property, a potential tenant of property, an owner of property, a lender, or a property manager (ASTM, 2013). In line with this definition, the user is the person/organization requesting this Phase I ESA. As part of completing a Phase I ESA, the user has the following duties:

- Communicate in advance of the Site reconnaissance, any specialized knowledge or experience of the user that is material to RECs.
- Communicate in advance of the Site reconnaissance, any actual knowledge or any environmental lien or AULs encumbering the property or in connection with the property.
- Consider the relationship of the purchase price of the property to the fair market value of the property if the property was not affected by hazardous substances or petroleum products.
- Communicate in advance of the Site reconnaissance, any commonly known or reasonably ascertainable information within the local community about the property that is material to RECs in connection with the property.
- Make known the reason why the user wants to have the Phase I ESA performed.

Ms. Fumiyo Okuda, Manager for Columbus East LLC. was interviewed as the Site user. Ms. Okuda has been familiar with the Site for less than one year and stated that the Site was purchased to advance a commercial potable water well. Ms. Okuda satisfied User responsibilities under ASTM E1527-13. None of the information obtained from Ms. Okuda represents a REC for the Site.

This page is intentionally left blank.

# **Section 4 Records Review**

According to the ASTM (2013), "The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the property." The following records and lists were reviewed for sites equal to or greater than the ASTM specified minimum search distance from the Site.

## Sites Within One Mile of the Site

- EPA National Priority List (NPL)
- EPA Resource Conservation and Recovery Act (RCRA) Corrective Action Site (CORRACTS) List
- DOH State Hazardous Waste Site (SHWS)
- EPA National Pollutant Discharge Elimination System (NPDES)

## Sites Within 0.5 Mile of the Site

- EPA Delisted NPL
- Federal Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) List
- CERCLIS No Further Remedial Action Planned (NFRAP) List
- EPA RCRA Treatment, Storage, and/or Disposal (TSD) Facilities List
- DOH Landfill and/or Solid Waste Disposal Site Lists
- DOH leaking underground storage tanks (LUSTs) List

### On the Site and Adjoining Properties

- DOH Registered underground storage tank (UST) List
- RCRA Generators List

#### On the Site

- Federal Emergency Response Notification System (ERNS) List
- EPA Institutional Controls and Engineering Controls Lists
- DOH Institutional Control and Engineering Control Lists
- DOH Voluntary Response Program List
- DOH Brownfields List

Explanations of each federal record or list are provided in EDR's report (Appendix B). DOH records that may not be included in the EDR are included in this report.

## 4.1 Federal NPL Site List

The Federal NPL includes those sites listed and proposed to be listed on the NPL (Superfund), as well those which have had a Superfund Liens notice filed. The NPL is a subset of the CERCLIS, and identifies over 1,200 sites for priority cleanup under the Superfund Program.

There are no NPL sites listed on or within one mile of the Site (EDR, 2018), and the Site is not listed (EDR, 2018).

## 4.2 Federal Delisted NPL Site List

There are no delisted NPL sites listed on or within one mile of the Site (EDR, 2018), and the Site is not listed (EDR, 2018).

## 4.3 Federal CERCLIS List

CERCLIS contains data on potentially hazardous waste sites that are either proposed to or on the NPL, as well as sites which are in the screening and assessment phase for possible inclusion on the NPL. Additionally, all EPA Federal Facilities Restoration and Reuse Office involved in cleanup activities are listed in this database.

There is one CERCLA SEMS site listed; the former Waiakea Pond Products Plant is located approximately 2,200 feet from the Site. Sediment and soil has shown high levels of arsenic and other heavy metals from former use as a sugar mill/canec board treatment plant. There is no concern for the Site from this listing since there is no likely pathway for contamination from the SEMS site. Federal CERCLIS sites listed on or within one mile of the Site; there are no EPA Federal Facilities Restoration and Reuse Office involved in cleanup activities within one mile of the site; and the Site is not listed (EDR, 2018).

## 4.4 Federal CERCLIS NFRAP Site List

There are no CERCLIS-NFRAP sites listed within one-mile of the Site, and the Site is not listed. (EDR, 2018).

## 4.5 Federal RCRA CORRACTS Facilities List

Hazardous waste handlers with RCRA CORRACTS activity are listed in this database.

There are no RCRA CORRACTS facilities located within a mile of the Site, and the Site is not listed (EDR, 2018).

## 4.6 Federal RCRA non-CORRACTS TSD Facilities List

Information on RCRA defined hazardous waste TSD activities are listed in this database.

There is one RCRA non-CORRACTS TSD facility listed within one-half mile of the Site, and the Site is not listed. There are no listed violations for the listed site that could impact the Site (EDR, 2018).

## 4.7 Federal RCRA Generators List

The Federal RCRA generators list includes large, small and conditionally exempt small quantity hazardous waste generators.

There are no RCRA generators listed within one-quarter mile of the Site, and the Site is not listed (EDR, 2018).

## 4.8 Federal Institutional Controls/Engineering Controls Registries

This database includes a listing of engineering and institutional controls in place in order to create pathway elimination for regulated substances to enter environmental media or effect human health.

There are no federal institutional controls or engineering controls listed within one-quarter mile of the Site, and the Site is not listed (EDR, 2018).

## 4.9 Federal ERNS List

The Federal ERNS List records and stores information on reported releases of oil and hazardous substances.

There are no federal ERNS events reported on the Site (EDR, 2018).

## 4.10 DOH SHWS

The SHWS records are the state's equivalent to CERCLIS. These sites may or may not be listed on the federal CERCLIS list. The SHWS list contains information on sites identified by the State of Hawai'i as abandoned, inactive, or uncontrolled hazardous waste sites that may require cleanup.

There were no SHWS within one-quarter of a mile from the Site, and 22 SHWS listed within one mile from the Site (EDR, 2018).

• The 22 SHWS reported within one mile of the Site do not represent a REC for the Site due to their cleanup status with DOH and/or distance/elevation/gradient relative to the Site (EDR, 2018).

## 4.11 State Landfill and/or Solid Waste Disposal Site Lists

Records in this database typically contain an inventory of solid waste disposal facilities or landfills in a particular state.

There are no state or tribal landfill and/or solid waste disposal sites listed within one-half mile of the Site, and the Site is not listed (EDR, 2018).

## 4.12 State Leaking Underground Storage Tank Lists

This database includes an inventory of reported LUSTs.

There were 10 state LUSTs listed within one-half mile of the Site, and the Site is not listed (DOH, 2004; EDR, 2018).

Given the status of the LUST sites (NFA), they are not considered a concern for the Site (EDR, 2018).

## 4.13 State Registered Underground Storage Tank Lists

This database includes an inventory of reported USTs.

There are no state USTs listed within one-quarter mile of the Site and the Site is not listed. (DOH, EDR, 2018).

None of the UST listings represent a concern for the Site (EDR, 2018).

#### 4.14 State Institutional Control/Engineering Control Registries

This database includes a listing of sites with engineering and/or institutional controls in place.

There were no state engineering and/or institutional controls registered within one-half mile of the Site, and the Site is not registered (EDR, 2018).

### 4.15 State Voluntary Cleanup Sites

This database includes a listing of voluntary cleanup priority sites.

There are no state or tribal voluntary cleanup priority sites recorded within one-half mile of the Site, and the Site is not listed (EDR, 2018).
### 4.16 State Brownfields Sites

This database includes an inventory of state and tribal "Brownfield sites" which are defined as: any real property where the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant (EDR, 2018).

There were no state or tribal Brownfield site within one-half mile of the Site, and the Site is not listed (EDR, 2018).

### 4.17 State Land Records

These records include the CERCLA Lien Information, which indicate where the EPA has spent Superfund monies to investigate releases and threatened releases of contamination. Additionally, records of land use control information pertaining to former Navy Base Realignment and Closure properties, is included.

There are no CERCLA Liens filed at the Site, and there are no records of land use control information within one-half mile of the Site (EDR, 2018).

### 4.18 Records of Emergency Release Reports

This database includes the Hazardous Materials Incident Report System, which incorporates spills reported to the DOT.

There are no records of Emergency Release Reports on the Site (EDR, 2018).

### 4.19 Other Ascertainable Records

These records include inventories from a variety of select environmental databases; the full list of which is available in the EDR (EDR, 2018).

There were no Other Ascertainable Records found for sites within one-quarter mile of the Site (EDR, 2018).

### 4.20 EDR Proprietary Records

The EDR Proprietary Manufactured Gas Plant Database includes an inventory of coal gas plants compiled by EDR researchers.

There are no Manufactured Gas Plants found within a mile of the Site (EDR, 2018).

This page is intentionally left blank.

## **Section 5 Current/Historical Use**

Mr. Harvey Taira, Properties Manager for the previous owner, Suisan Company, Ltd. was interviewed as the Site contact. Mr. Taira has been familiar with the Site for at least 20 years, during which time it was used as a fruit warehouse and Quonset hut prior to being demolished in the early 1990s. Mr. Taira satisfied site contact responsibilities under ASTM E1527-13. None of the information obtained from Mr. Taira represents a REC for the Site.

No information disclosed by current or historical owners/occupants represents a REC for the Site.

This page is intentionally left blank.

## **Section 6 Site Reconnaissance**

The Site visit was conducted on Monday, March 26, 2018 by LEI personnel. All observations were based on the Site's conditions at the time of LEI's reconnaissance. Photographs taken during the site visit are included in Appendix A. The Site has been unused and includes natural foliage and small amounts of abandoned tires and garbage.

# 6.1.1 USTs, Aboveground Storage Tanks (ASTs), Oil/Water Separators, Pipelines

No USTs, ASTs, oil/water separators or pipelines were observed at the Site.

### 6.1.2 Drains

No drains, pits, ponds, pools were observed at the Site.

### 6.1.3 Indication of Polychlorinated Biphenyl (PCB) Containing Materials

No potentially PCB containing materials were observed at the Site.

### 6.1.4 Mercury

There was no indication of mercury-containing materials at the Site during the time of the Site reconnaissance.

### 6.1.5 Chlorofluorocarbons (CFCs)

No potential CFC-containing materials were observed at the Site.

### 6.1.6 Stains and Chemical Odors

No staining or chemical odors were observed at the Site.

### 6.1.7 Adjacent Properties

Adjacent property uses include open land and Waiakea Pond to the west, open land to the east and residential and commercial uses to the south. There was no evidence of runoff or other potential contamination observed during the site reconnaissance.

## **Section 7 Data Gaps**

A data gap is a lack of or inability to obtain information required by ASTM E 1527-13 despite good faith efforts by the environmental professional to gather such information. Data gaps may result from incompleteness in any of the activities required by this practice (ASTM, 2013). In performing this Phase I ESA, no data gaps were identified.

## **Section 8 Conclusions and Opinions**

This Phase I ESA has been performed in conformance with the scope and limitations of ASTM E 1527-13 for the Site. Any exceptions to, or deletions from this practice are described in Section 9 of this report.

This assessment has not revealed evidence of a historical or current REC in connection with the Site.

### **De Minimis Items of Concern**

• Abandoned tires and trash was observed at the Site. These materials should be properly disposed.

### **Data Gaps**

• In performing this Phase I ESA, no data gaps were identified.

This page is intentionally left blank.

## **Section 9 Limitations**

The conclusions and recommendations of this ESA have been based on interpretation of the available historical and regulatory information, and a visual Site reconnaissance. No guarantee or warrant is made that the Site is free of contamination. This Phase I ESA was performed with the usual competence and thoroughness of the consulting profession, in accordance with the standard operating procedures of this time. LEI does not provide any other guarantee or warranty.

This Phase I ESA is not a comprehensive site characterization and should not be construed as such. The opinions presented in this report are based on findings derived from a site reconnaissance and a review of specified regulatory records and historical sources. This Phase I ESA did not include any investigation with respect to lead, asbestos, arsenic, radon, methane, regulatory compliance, cultural and historical resources, industrial hygiene, health and safety, ecological resources, endangered species, indoor air quality, or site geotechnical concerns. All information on UST and LUST sites are based on information reported to the DOH Solid and Hazardous Waste Branch. All information on DOH Hazard Evaluation and Emergency Response (HEER) listed sites and release sites are based on information reported to the DOH HEER Office.

There are no exceptions or deletions to ASTM practice in this Phase I ESA.

This page is intentionally left blank.

## Section 10 References

- ASTM, 2013. Standard Practice for ESAs: Phase I ESA Process. ASTM, E 1527-13.
- COH, 2017. County of Hawaii Planning Department website. Accessed at <u>http://www.cohplanningdept.com/</u> on March 20, 2013.
- DOH, 2004. DOH, UST/LUST Database. Available online at: http://hawaii.gov/health/environmental/waste/ust/data.html.
- EDR, 2018. The EDR Radius Map Report with GeoCheck, Hilo, Hawai'i,
- Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.
- Google, 2007. Google Earth Imagery.
- HCC, 2005. Hawai'i County Code 1983 (2005 Edition, as amended).
- Macdonald, G.; Abbott, A.; and Peterson, F., 1983. Volcanoes in the Sea, University of Hawai'i Press, Honolulu, Hawai'i.
- Mink, J. F. and Lau, S., 1990. Aquifer Identification and Classification for *Hawaii*: Groundwater Protection Strategy for Hawai'i. Water Resources Research Center, University of Hawai'i, Technical Report 179. February.

.

This page is intentionally left blank.

Appendix A: Photographs



### North side of property



### East side of property

South side of property



### Tires found on northeast corner



### Tires found on northeast corner



### Tires found on north east corner



TV found on north east corner



### Rubbish can found on north east corner



North west corner marker



### South east corner marker



### South west corner marker



### South west vegetation



### North side vegetation



### East side vegetation

### South side vegetation

Appendix B: EDR Database Search

### 525 Piilani Street

525 Piilani Street Hilo, HI 96720

Inquiry Number: 5207731.2s March 05, 2018

## The EDR Radius Map<sup>™</sup> Report with GeoCheck<sup>®</sup>



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

FORM-LBC-RG

### **TABLE OF CONTENTS**

#### SECTION

#### PAGE

Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	8
Orphan Summary	56
Government Records Searched/Data Currency Tracking	GR-1

#### **GEOCHECK ADDENDUM**

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-7
Physical Setting Source Map Findings	A-9
Physical Setting Source Records Searched	PSGR-1

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

#### **Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental St Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2018 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

#### TARGET PROPERTY INFORMATION

#### ADDRESS

525 PIILANI STREET HILO, HI 96720

#### COORDINATES

 Latitude (North):
 19.7172100 - 19° 43' 1.95"

 Longitude (West):
 155.0709960 - 155° 4' 15.58"

 Universal Tranverse Mercator:
 Zone 5

 UTM X (Meters):
 282938.7

 UTM Y (Meters):
 2181382.2

 Elevation:
 12 ft. above sea level

#### USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: Version Date: 5949390 HILO, HI 2013

#### Target Property Address: 525 PIILANI STREET HILO, HI 96720

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACBONYMS	RELATIVE FI EVATION	DIST (ft. & mi.) DIBECTION
1	KUAWA STREET SOCCER	KAMEHAMEHA HWY AND M	SHWS	Lower	1689, 0.320, North
A2	WAIAKEA UPLAND ARSEN	CORNER OF MILILANI A	SHWS	Higher	1698, 0.322, South
A3	EXEMPT UST CLOSURE A	458 KEKUANAOA ST	SHWS, SPILLS	Higher	1771, 0.335, South
A4	EXCELSIOR DAIRY	458 KEKAUANAOA ST	LUST, UST	Higher	1771, 0.335, South
5	S.K. ODA, LTD.	180 KALANIKOA ST	LUST, UST	Higher	1787, 0.338, ENE
6	PHILLIPS U DRIVE INC	920 PIILANI ST	LUST, UST	Higher	1841, 0.349, East
7	JACK'S TOURS	226 KANOELEHUA AVE	LUST, UST	Lower	2188, 0.414, ENE
8	SHIPMAN GENERATING S	20 BANYAN DRIVE	RCRA-TSDF, RCRA-SQG	Lower	2225, 0.421, NNE
B9	WAIAKEA POND/HAWAIIA	HILO	SEMS	Higher	2296, 0.435, West
B10	LARRY'S CHEVRON	835 KILAUEA AVE	SHWS, LUST, UST, Financial Assurance	Higher	2361, 0.447, West
11	HELCO PIPELINE RELEA	KANOELEHUA AVE & HUA	SHWS	Higher	2385, 0.452, ESE
12	UST EXCAVATED BISHOP	BISHOP ST AND KAMEHA	SHWS	Lower	2406, 0.456, NW
C13	TESORO GAS EXPRESS 8	1672 KAMEHAMEHA AVE	LUST, UST, Financial Assurance	Lower	2449, 0.464, NE
C14	HARPER CAR & TRUCK R	1690 KAMEHAMEHA AVE	LUST, UST	Lower	2460, 0.466, NE
D15	DUKE'S SHELL	1104 KILAUEA AVE.	LUST, UST, Financial Assurance	Higher	2508, 0.475, SW
D16	PACIFIC RENT-ALL, IN	1080 KILAUEA AVE	LUST, UST	Higher	2523, 0.478, SW
17	AIM HILO	761 KEKUANAOA ST	LUST, UST, Financial Assurance	Higher	2629, 0.498, SE
18	HILO SHOPPING CENTER	1255 KILAUEA AVE	SHWS, SPILLS	Higher	2766, 0.524, SW
19	KHI INC. DBA BAYSIDE	774 KAMEHAMEHA AVE	SHWS, LUST, UST, INST CONTROL, SPILLS, Financial	. Lower	2786, 0.528, NW
20	STATIONERS CORPORATI	708 KANOELEHUA AVE	SHWS, SPILLS	Higher	3356, 0.636, SE
21	HELCO PIPELINE ANOMA	126 BANYAN WY	SHWS, SPILLS	Lower	3459, 0.655, NE
22	SUN SUN LAU CHOP SUE	1055 KINOOLE ST	SHWS, SPILLS	Higher	3604, 0.683, WSW
E23	HILO QUALITY WASHERE	210 HOKU ST	SHWS, INST CONTROL, SPILLS	Higher	3788, 0.717, West
E24	HILO QUALITY CLEANER	865 KINOOLE ST	RCRA-CESQG, SHWS, SPILLS, FINDS, ECHO, AIRS	Higher	4011, 0.760, West
25	HILO SODA WORKS	270 E KAWILI ST	SHWS, LUST, UST	Higher	4086, 0.774, South
26	HATADA BAKERY (FORME	55 KUKUAU ST	SHWS, INST CONTROL, SPILLS	Higher	4407, 0.835, WNW
27	HILO MACARONI FACTOR	639 KINOOLE ST	SHWS, SPILLS	Higher	4558, 0.863, West
28	WOOD PROTECTION COMP	150 KEAA ST	SHWS, SPILLS	Higher	4575, 0.866, ENE
29	HILO MECHANICAL, INC	50 HOLOMUA ST	SHWS	Higher	4651, 0.881, SSE
30	HILO GAS COMPANY LTD	51-53 PONAHAWAI ST	EDR MGP	Lower	4708, 0.892, WNW
31	USDA FOREST SERVICE	1643 KILAUEA AVE	SHWS	Higher	4712, 0.892, South
32	HAWAII PEST CONTROL	56 WIWOOLE ST	SHWS	Higher	4887, 0.926, SSE
33	KANOELEHUA INDUSTRIA	20 POOKELA ST	SHWS, BROWNFIELDS	Higher	4946, 0.937, SSE
34	HILO ARSENIC	33B LILIUOKALANI LN	SHWS, ENG CONTROLS, INST CONTROL, SPILLS	Higher	5037, 0.954, WNW

#### TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

#### DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

#### STANDARD ENVIRONMENTAL RECORDS

#### Federal NPL site list

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
NPL LIENS	Federal Superfund Liens

#### Federal Delisted NPL site list

Delisted NPL\_\_\_\_\_ National Priority List Deletions

#### Federal CERCLIS list

FEDERAL FACILITY...... Federal Facility Site Information listing

#### Federal CERCLIS NFRAP site list

SEMS-ARCHIVE..... Superfund Enterprise Management System Archive

#### Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

#### Federal RCRA generators list

RCRA-LQG	RCRA - Large Quantity Generators
RCRA-SQG	RCRA - Small Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator

#### Federal institutional controls / engineering controls registries

LUCIS	Land Use Control Information System
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls

#### Federal ERNS list

ERNS\_\_\_\_\_ Emergency Response Notification System

#### State and tribal landfill and/or solid waste disposal site lists

SWF/LF\_\_\_\_\_ Permitted Landfills in the State of Hawaii

#### State and tribal leaking storage tank lists

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

#### State and tribal registered storage tank lists

FEMA UST	Underground Storage	Tank Listing
UST	Underground Storage	Tank Database
INDIAN UST	Underground Storage	Tanks on Indian Land

#### State and tribal institutional control / engineering control registries

ENG CONTROLS Engineering Control Sites INST CONTROL Sites with Institutional Controls

#### State and tribal voluntary cleanup sites

VCP.....Voluntary Response Program Sites INDIAN VCP.....Voluntary Cleanup Priority Listing

#### State and tribal Brownfields sites

BROWNFIELDS..... Brownfields Sites

#### ADDITIONAL ENVIRONMENTAL RECORDS

#### Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

#### Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
IHS OPEN DUMPS	Open Dumps on Indian Land

#### Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL	Delisted National Clandestine Laboratory Register
CDL	Clandestine Drug Lab Listing
US CDL	National Clandestine Laboratory Register

#### Local Land Records

LIENS 2..... CERCLA Lien Information

#### **Records of Emergency Release Reports**

HMIRS..... Hazardous Materials Information Reporting System

SPILLS	Release Notifications
SPILLS 90	SPILLS 90 data from FirstSearch

#### Other Ascertainable Records

RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
FUDS	Formerly Used Defense Sites
DOD	Department of Defense Sites
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR	Financial Assurance Information
EPA WATCH LIST	EPA WATCH LIST
2020 COR ACTION	2020 Corrective Action Program List
TSCA	Toxic Substances Control Act
TRIS	Toxic Chemical Release Inventory System
SSTS	Section 7 Tracking Systems
ROD	Records Of Decision
RMP	Risk Management Plans
RAATS	RCRA Administrative Action Tracking System
PRP	Potentially Responsible Parties
PADS	PCB Activity Database System
ICIS	Integrated Compliance Information System
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide
	Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	. Facility Index System/Facility Registry System
DOCKET HWC	Hazardous Waste Compliance Docket Listing
UXO	Unexploded Ordnance Sites
ECHO	. Enforcement & Compliance History Information
FUELS PROGRAM	. EPA Fuels Program Registered Listing
AIRS	List of Permitted Facilities
DRYCLEANERS	Permitted Drycleaner Facility Listing
Financial Assurance	Financial Assurance Information Listing
UIC	Underground Injection Wells Listing

#### EDR HIGH RISK HISTORICAL RECORDS

#### EDR Exclusive Records

EDR Hist Auto	EDR Exclusive Historical Auto Stations
EDR Hist Cleaner	EDR Exclusive Historical Cleaners

#### EDR RECOVERED GOVERNMENT ARCHIVES

#### **Exclusive Recovered Govt. Archives**

RGA HWS	<b>Recovered Government Archive</b>	State Hazardous Waste Facilities List
RGA LF	<b>Recovered Government Archive</b>	Solid Waste Facilities List
RGA LUST	<b>Recovered Government Archive</b>	Leaking Underground Storage Tank

#### SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property. Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in **bold italics** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

#### STANDARD ENVIRONMENTAL RECORDS

#### Federal CERCLIS list

SEMS: SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the SEMS list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1 SEMS site within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WAIAKEA POND/HAWAIIA	HILO	W 1/4 - 1/2 (0.435 mi.)	B9	15

#### Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-TSDF list, as provided by EDR, and dated 12/11/2017 has revealed that there is 1

RCRA-TSDF site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
SHIPMAN GENERATING S	20 BANYAN DRIVE	NNE 1/4 - 1/2 (0.421 mi.)	8	13

#### State- and tribal - equivalent CERCLIS

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 01/23/2018 has revealed that there are 22 SHWS sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
WAIAKEA UPLAND ARSEN	CORNER OF MILILANI A	S 1/4 - 1/2 (0.322 mi.)	A2	8
EXEMPT UST CLOSURE A	458 KEKUANAOA ST	S 1/4 - 1/2 (0.335 mi.)	A3	9
LARRY'S CHEVRON	835 KILAUEA AVE	W 1/4 - 1/2 (0.447 mi.)	B10	16
HELCO PIPELINE RELEA	KANOELEHUA AVE & HUA	ESE 1/4 - 1/2 (0.452 mi.)	11	18
HILO SHOPPING CENTER	1255 KILAUEA AVE	SW 1/2 - 1 (0.524 mi.)	18	28
STATIONERS CORPORATI	708 KANOELEHUA AVE	SE 1/2 - 1 (0.636 mi.)	20	33
SUN SUN LAU CHOP SUE	1055 KINOOLE ST	WSW 1/2 - 1 (0.683 mi.)	22	36
HILO QUALITY WASHERE	210 HOKU ST	W 1/2 - 1 (0.717 mi.)	E23	37
HILO QUALITY CLEANER	865 KINOOLE ST	W 1/2 - 1 (0.760 mi.)	E24	39
HILO SODA WORKS	270 E KAWILI ST	S 1/2 - 1 (0.774 mi.)	25	44
HATADA BAKERY (FORME	55 KUKUAU ST	WNW 1/2 - 1 (0.835 mi.)	26	46
HILO MACARONI FACTOR	639 KINOOLE ST	W 1/2 - 1 (0.863 mi.)	27	47
WOOD PROTECTION COMP	150 KEAA ST	ENE 1/2 - 1 (0.866 mi.)	28	49
HILO MECHANICAL, INC	50 HOLOMUA ST	SSE 1/2 - 1 (0.881 mi.)	29	50
USDA FOREST SERVICE	1643 KILAUEA AVE	S 1/2 - 1 (0.892 mi.)	31	51
HAWAII PEST CONTROL	56 WIWOOLE ST	SSE 1/2 - 1 (0.926 mi.)	32	52
KANOELEHUA INDUSTRIA	20 POOKELA ST	SSE 1/2 - 1 (0.937 mi.)	33	53
HILO ARSENIC	33B LILIUOKALANI LN	WNW 1/2 - 1 (0.954 mi.)	34	53
Lower Elevation	Address	Direction / Distance	Map ID	Page
KUAWA STREET SOCCER	KAMEHAMEHA HWY AND M	N 1/4 - 1/2 (0.320 mi.)	1	8
UST EXCAVATED BISHOP	BISHOP ST AND KAMEHA	NW 1/4 - 1/2 (0.456 mi.)	12	19
KHI INC. DBA BAYSIDE	774 KAMEHAMEHA AVE	NW 1/2 - 1 (0.528 mi.)	19	29
HELCO PIPELINE ANOMA	126 BANYAN WY	NE 1/2 - 1 (0.655 mi.)	21	34

#### State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Health's Active Leaking Underground Storage Tank Log Listing.

A review of the LUST list, as provided by EDR, and dated 08/01/2017 has revealed that there are 10 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
<i>EXCELSIOR DAIRY</i> Release ID: 990210 Facility Id: 9-603524 Facility Status: Site Cleanup Complet	458 KEKAUANAOA ST ed (NFA)	S 1/4 - 1/2 (0.335 mi.)	A4	11
<i>S.K. ODA, LTD.</i> Release ID: 900012 Facility Id: 9-600449 Facility Status: Site Cleanup Complet	180 KALANIKOA ST ed (NFA)	ENE 1/4 - 1/2 (0.338 mi.)	5	11
PHILLIPS U DRIVE INC Release ID: 940182 Facility Id: 9-600480 Facility Status: Site Cleanup Complet	920 PIILANI ST ed (NFA)	E 1/4 - 1/2 (0.349 mi.)	6	12
LARRY'S CHEVRON Release ID: 030044 Facility Id: 9-601136 Facility Status: Site Cleanup Complet	<i>835 KILAUEA AVE</i> ed (NFA)	W 1/4 - 1/2 (0.447 mi.)	B10	16
DUKE'S SHELL Release ID: 020029 Release ID: 930099 Facility Id: 9-601320 Facility Status: Site Cleanup Complet	1104 KILAUEA AVE. ed (NFA)	SW 1/4 - 1/2 (0.475 mi.)	D15	23
PACIFIC RENT-ALL, IN Release ID: 940099 Facility Id: 9-601678 Facility Status: Site Cleanup Complet	1080 KILAUEA AVE ed (NFA)	SW 1/4 - 1/2 (0.478 mi.)	D16	26
AIM HILO Release ID: 050009 Facility Id: 9-601195 Facility Status: Site Cleanup Complet	761 KEKUANAOA ST ed (NFA)	SE 1/4 - 1/2 (0.498 mi.)	17	26
Lower Elevation	Address	Direction / Distance	Map ID	Page
JACK'S TOURS Release ID: 030001 Facility Id: 9-603750 Facility Status: Site Cleanup Complet	226 KANOELEHUA AVE	ENE 1/4 - 1/2 (0.414 mi.)	7	12
<b>TESORO GAS EXPRESS 8</b> Release ID: 940057 Facility Id: 9-600708 Facility Status: Site Cleanup Complet	1672 KAMEHAMEHA AVE ed (NFA)	NE 1/4 - 1/2 (0.464 mi.)	C13	20
HARPER CAR & TRUCK R Release ID: 960054 Facility Id: 9-603156 Facility Status: Site Cleanup Complet	1690 KAMEHAMEHA AVE ed (NFA)	NE 1/4 - 1/2 (0.466 mi.)	C14	22

#### EDR HIGH RISK HISTORICAL RECORDS

#### EDR Exclusive Records

EDR MGP: The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

A review of the EDR MGP list, as provided by EDR, has revealed that there is 1 EDR MGP site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
HILO GAS COMPANY LTD	51-53 PONAHAWAI ST	WNW 1/2 - 1 (0.892 mi.)	30	51

Due to poor or inadequate address information, the following sites were not mapped. Count: 10 records.

#### Site Name

HILO JUDICIARY CENTER PROJECT HILO SAFEWAY/TARGET ARMY AVIATION SUPPORT FACILITY #2 PACIFIC AQUACULTURE AND COASTAL RE HAWAII COUNTY KAMEHAMEHA AVENUE IM WAIAKEA MILL COMPANY - CAMP 1 ARSENIC MILILANI STREET IN HILO WAILOA RIVER STATE RECREATION AREA KILAUEA VOLCANO AIR MONITORING HILO BAY FRONT SOCCER FIELD Database(s)

SHWS, ENG CONTROLS, INST CONTROL SHWS, ENG CONTROLS, INST CONTROL SHWS SHWS, BROWNFIELDS SHWS SHWS SHWS, INST CONTROL, SPILLS SHWS SEMS SEMS SEMS-ARCHIVE

### **OVERVIEW MAP - 5207731.2S**



SITE NAME:	525 Piilani Street	CLIENT:	Lehua Environmental Consultants, LLC
ADDRESS:	525 Piilani Street	CONTACT:	Kama
LAT/LONG:	Hilo HI 96720	INQUIRY #:	5207731.2s
	19.71721 / 155.070996	DATE:	March 05, 2018 12:59 pm

### DETAIL MAP - 5207731.2S



SITE NAME:	525 Piilani Street	CLIENT:	Lehua Environmental Consultants, LLC
ADDRESS:	525 Piilani Street	CONTACT:	Kama
LAT/LONG:	HID HI 96720 19.71721 / 155.070996	DATE:	5207731.2s March 05, 2018 12:59 pm

### **MAP FINDINGS SUMMARY**

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	>1	Total Plotted
STANDARD ENVIRONMEN	TAL RECORDS							
Federal NPL site list								
NPL Proposed NPL NPL LIENS	1.000 1.000 0.001		0 0 0	0 0 NR	0 0 NR	0 0 NR	NR NR NR	0 0 0
Federal Delisted NPL si	te list							
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY SEMS	0.500 0.500		0 0	0 0	0 1	NR NR	NR NR	0 1
Federal CERCLIS NFRA	P site list							
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRAC	TS facilities li	ist						
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-COR	RRACTS TSD I	facilities list						
RCRA-TSDF	0.500		0	0	1	NR	NR	1
Federal RCRA generato	rs list							
RCRA-LQG RCRA-SQG RCRA-CESQG	0.250 0.250 0.250		0 0 0	0 0 0	NR NR NR	NR NR NR	NR NR NR	0 0 0
Federal institutional con engineering controls re	ntrols / gistries							
LUCIS US ENG CONTROLS US INST CONTROL	0.500 0.500 0.500		0 0 0	0 0 0	0 0 0	NR NR NR	NR NR NR	0 0 0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equiva	alent CERCLIS	S						
SHWS	1.000		0	0	6	16	NR	22
State and tribal landfill a solid waste disposal sit	and/or e lists							
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking	storage tank l	lists						
LUST INDIAN LUST	0.500 0.500		0 0	0 0	10 0	NR NR	NR NR	10 0
State and tribal register	ed storage tar	nk lists						
FEMA UST	0.250		0	0	NR	NR	NR	0
# **MAP FINDINGS SUMMARY**

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UST INDIAN UST	0.250 0.250		0 0	0 0	NR NR	NR NR	NR NR	0 0
State and tribal institution control / engineering control / engin	onal ntrol registrie	S						
ENG CONTROLS	0.500 0.500		0 0	0 0	0 0	NR NR	NR NR	0 0
State and tribal voluntar	y cleanup site	es						
VCP INDIAN VCP	0.500 0.500		0 0	0 0	0 0	NR NR	NR NR	0 0
State and tribal Brownfie	elds sites							
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMEN	ITAL RECORDS	<u>8</u>						
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / S Waste Disposal Sites	Solid							
INDIAN ODI DEBRIS REGION 9 ODI	0.500 0.500 0.500		0 0 0	0 0 0	0 0 0	NR NR NR	NR NR NR	0 0 0
Local Lists of Hazardous	0.500 s waste /		U	0	0	INFL		0
US HIST CDI	0.001		0	NB	NB	NB	NB	0
CDL US CDL	0.001 0.001		0 0	NR NR	NR NR	NR NR	NR NR	0 0
Local Land Records								
LIENS 2	0.001		0	NR	NR	NR	NR	0
Records of Emergency I	Release Repo	rts						
HMIRS SPILLS SPILLS 90	0.001 0.001 0.001		0 0 0	NR NR NR	NR NR NR	NR NR NR	NR NR NR	0 0 0
Other Ascertainable Rec	ords							
RCRA NonGen / NLR FUDS DOD SCRD DRYCLEANERS US FIN ASSUR EPA WATCH LIST	0.250 1.000 0.500 0.001 0.001		0 0 0 0 0	0 0 0 NR NR	NR 0 0 NR NR	NR 0 NR NR NR	NR NR NR NR NR	
TSCA	0.250		0	NR	NR	NR	NR	0

# **MAP FINDINGS SUMMARY**

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	<u>1/2 - 1</u>	> 1	Total Plotted
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	0.001		0	NR	NR	NR	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.001		0	NR	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
AIRS	0.001		0	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORIC	AL RECORDS							
EDR Exclusive Records								
	1 000		0	0	0	4		4
	1.000		0					1
EDR Hist Auto	0.125		0					0
EDR HISt Cleaner	0.125		0	INF	INF	INF	INF	0
EDR RECOVERED GOVER	MENT ARCHIV	VES						
Exclusive Recovered Go	ovt. Archives							
BGA HWS	0.001		Ω	NR	NR	NR	NR	Ο
BGALE	0.001		n N	NR	NR	NR	NR	0
BGALUST	0.001		n N	NR	NR	NR	NR	0
	0.001		U		INIL			U
- Totals		0	0	0	18	17	0	35
							-	

# **MAP FINDINGS SUMMARY**

	Search							
	Distance	Target						Total
Database	(Miles)	Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	>1	Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Database(s)

EDR ID Number EPA ID Number

1 North 1/4-1/2 0.320 mi. 1689 ft.	KUAWA STREET SOCCER KAMEHAMEHA HWY AND N HILO, HI 96720	FIELDS DEV //ANONO ST	ELOPMENT SITE	SHWS	S118422838 N/A
Relative:	SHWS:				
Lower	Organization:	Not reported	t		
Actual:	Supplemental Location:		Not reported		
3 ft.	Island:	Hawaii			
	Environmental Interest:	••••	Kuawa Street Soccer Fields Development Site		
	HID Number:	Not reported			
	Facility Registry Identifie	er:	Not reported		
	Lead Agency:	HEER			
	Program:	State			
	Project Manager:	John Peard			
	Razaru Priority.		Hazard Propert		
	Fotential Hazards And C	Hawaii	Hazalu Flesent		
	SDAR Environmental In	torost Namo	Kuawa Street Soccer Fields Development Site		
	HID Number:	Not reported	1		
	Facility Registry Identifie	er.	Not reported		
	Lead Agency:	HEER			
	Potential Hazard And C	ontrols:	Hazard Present		
	Priority:	Medium			
	Assessment:	Response N	lecessary		
	Response:	Response C	Dngoing		
	Nature of Contamination	ו:	Found: Contaminants found over Tier 1 EALs in site scree	ening: Lea	d and
			Arsenic.		
	Nature of Residual Cont	tamination:	Not reported		
	Use Restrictions:		Controls Required to Manage Contamination		
	Engineering Control:		Not reported		
	Description of Restrictio	ns:	Not reported		
	Institutional Control:		Not reported		
	Within Designated Area	wide Contam	Natioeported		
	Sile Closure Type.	Not reported			
	Document Number:	Not reported	4		
	Document Subject:	Not reported	Not reported		
	Project Manager	John Peard			
	Contact Information	bolin i cara	(808) 933-9921 Environmental Health Bldg 1582 Kameh	ameha Ave	e Hilo
			HI 96720		,,
A2 South 1/4-1/2 0.322 mi.	WAIAKEA UPLAND ARSEN CORNER OF MILILANI AND HILO, HI 96720	IC SITE KEKUANA(	D STREETS	SHWS	S110061849 N/A
1698 ft.	Site 1 of 3 in cluster A				
Relative:	SHWS:				
riigher	Organization:	Not reported	) Dertien of Heureli Conce Draduate eite		
Actual:	Supplemental Location:	Howe	Fortion of Hawaii Cane Products site		
1911.	Environmental Interest:	riawall	Waiakea Upland Arsenic Site		

110013775619

Project Manager:

Hazard Priority:

Facility Registry Identifier: Lead Agency: Program: HEER

State

Low

John Peard

Database(s)

EDR ID Number EPA ID Number

S110061849

1006820203 N/A

#### WAIAKEA UPLAND ARSENIC SITE (Continued)

Potential Hazards And Controls: Hazard Present Island: Hawaii SDAR Environmental Interest Name: Waiakea Upland Arsenic Site HID Number: Not reported Facility Registry Identifier: 110013775619 Lead Agency: HEER Hazard Present Potential Hazard And Controls: Priority: Low Assessment: Assessment Ongoing Response: Not reported Found: Arsenic in soil. Nature of Contamination: Nature of Residual Contamination: Not reported Use Restrictions: Controls Required to Manage Contamination Engineering Control: Not reported Description of Restrictions: Not reported Not reported Institutional Control: Within Designated Areawide ContamiNatioeported Site Closure Type: Not reported Document Date: Not reported Document Number: Not reported Document Subject: Not reported John Peard Project Manager: Contact Information: (808) 933-9921 Environmental Health Bldg, 1582 Kamehameha Ave, Hilo, HI 96720

A3 South 1/4-1/2 0.335 mi.	EXEMPT UST CLOSURE A1 458 KEKUANAOA ST HILO, HI 96720	EXCELSIO	R DAIRY	SHWS SPILLS
1771 ft.	Site 2 of 3 in cluster A			
Relative: Higher Actual: 20 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identific Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And G Island: SDAR Environmental Ir HID Number: Facility Registry Identific Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contamination Nature of Residual Con Use Restrictions: Engineering Control: Description of Restriction	Not reported Hawaii Not reported er: HEER State Mark Sutter NFA Controls: Hawaii terest Name Not reported er: HEER ontrols: NFA Response N Response On: tamination:	d Not reported Exempt UST Closure at Excelsior Dairy d 110013781201 field No Hazard : Exempt UST Closure at Excelsior Dairy d 110013781201 No Hazard Nocessary Complete Found: Diesel Diesel No Hazard Present for Unrestricted Residential Use Not reported Not reported	
	Institutional Control:		Not reported	

Map ID	
Direction	
Distance	
Elevation	Site

EDR ID Number Database(s) EPA ID Number

Within Designated Area	wide Contami <b>Natioe</b> ported	
Site Closure Type:	No Further Action Letter - Unrestricted Residential Use	
Document Date:	12/19/2005	
Document Number:	2005-671-MS	
Document Subject	NFA letter for diesel UST at Excelsior Dairy Hilo	
Project Manager	Mark Sutterfield	
Contact Information:	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782	
HI SPILLS:		
Island:	Hawaii	
Supplemental Loc. Text	Not reported	
Case Number:	19991112-1052	
HID Number:	Not reported	
Facility Registry Id:	110013781201	
Lead and Program	HEER EP&R	
FB.	No	
Linite:	Exempt LIST Closure @ Excelsion Dainy	
Substances:		
Loop Or Greater Then:	Net reported	
Less Of Greater Than.	Not reported	
Numerical Quantity.	Not reported	
	Not reported	
Activity Type:	Response	
Activity Lead:	Bill Perry	
Assignment End Date:	Not reported	
Result:	Refer to ISST	
File Under:	Excelsior Dairy, Inc.	
Latitude:	19.66932	
Longitude:	-155.307075	
Island:	Hawaii	
Supplemental Loc. Text	Not reported	
Case Number:	19991112-1052	
HID Number:	Not reported	
Facility Registry Id:	110013781201	
Lead and Program:	HEER EP&R	
ER:	No	
Units:	Exempt UST Closure @ Excelsior Dairy	
Substances:	Diesel Fuel	
Less Or Greater Than:	Not reported	
Numerical Quantity:	Not reported	
Units:	Not reported	
Activity Type	Response	
Activity Lead:	Rill Perry	
Assignment End Date:	Not reported	
Recult:	Refer to ISST	
File I Inder:		
	10 71140	
	15./ 1 140 155 071000	
Longitude:	-100.071900	

Database(s)

A4 South 1/4-1/2 0.335 mi. 1771 ft	EXCELSIOR DAIRY 458 KEKAUANAOA ST HILO, HI 96720 Site 3 of 3 in cluster A		LUS1 US1	U003711780 N/A
Relative:	LUST <sup>.</sup>			
Higher Actual: 20 ft.	Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-603524 Site Cleanup Completed (NFA) 02/23/2006 990210 Shaobin Li		
	UST <sup>.</sup>			
	Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference I Horizontal Collection N	9-603524 EXCELSIOR DIARY, INC C/O MOUNTAIN VIEW DAIRY, INC POB 101 Hilo, 96720 96720 19.711522 -155.071813 Datum Name: NAD83 Method Name: Address Matching		
	Tank ID:	R-2		
	Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	01/01/1970 <b>Permanently Out of Use</b> 06/07/1999 550 Gasoline		
5 ENE 1/4-1/2 0.338 mi. 1787 ft.	S.K. ODA, LTD. 180 KALANIKOA ST HILO, HI 96720		LUSI USI	U001236872 N/A
Relative:	LUST:			
Higher Actual: 13 ft.	Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-600449 Site Cleanup Completed (NFA) 09/27/1994 900012 Eric Sadoyama		
	UST:			
	Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference I Horizontal Collection M Tank ID: Date Installed:	9-600449 S.K. ODA, LTD. 1088 WAIHOLO ST Hilo, 96720 96720 19.719967 -155.065869 Datum Name: NAD83 Method Name: Address Matching R-1 03/21/1961 Bermanth Out of Lice		
	Tank Status: Date Closed: Tank Capacity: Substance:	Permanently Out of Use Not reported 6000 Gasoline		

Map ID Direction		MAP FINDINGS		
Elevation	Site		Database(s)	EPA ID Number
6 East 1/4-1/2 0.349 mi. 1841 ft.	PHILLIPS U DRIVE INC. 920 PIILANI ST HILO, HI 96720		LUST UST	U001236891 N/A
Relative: Higher Actual: 21 ft.	LUST: Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-600480 Site Cleanup Completed (NFA) 08/18/1994 940182 Eric Sadoyama		
	UST: Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference Horizontal Collection N	9-600480 PHILLIPS U DRIVE INC. 920 PIILANI ST Hilo, 96720 96720 19.716300 -155.065379 Datum Name: NAD83 Method Name: Address Matching		
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-1 04/24/1976 <b>Permanently Out of Use</b> 03/19/1991 8000 Gasoline		
7 ENE 1/4-1/2 0.414 mi. 2188 ft.	JACK'S TOURS 226 KANOELEHUA AVE HILO, HI 96720		LUST UST	U003886215 N/A
Relative: Lower Actual: 11 ft.	LUST: Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-603750 Site Cleanup Completed (NFA) 01/31/2003 030001 Jose Ruiz		
	UST: Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference I Horizontal Collection N Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	9-603750 JACK IWAO MIYASHIRO RECOVABLE LIVING TRUST C/O ELLEN MIYASHIRO SAKAGAWA 5871 SOLEDAD ROAD Hilo, 96720 96720 19.719360 -155.064476 Datum Name: NAD83 Method Name: Address Matching R-1 Not reported Permanently out of Use 10/04/2002 10000		

Database(s)

	JACK'S TOURS (Continued)					
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-2 Not reporte <b>Permanen</b> 10/04/2002 10000 Diesel	ed tly out of Use e			
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-3 Not reporte <b>Permanen</b> 10/04/2002 1000 Used Oil	ed tly out of Use			
8 NNE 1/4-1/2 0.421 mi. 2225 ft.	SHIPMAN GENERATING S 20 BANYAN DRIVE HILO, HI 96720	STATION	F	RCRA-TSDF RCRA-SQG	1007092162 HIT000610899	
Relative:	RCRA-TSDF:					
Lower	Date form received by	/ agency:	03/19/2003			
Actual:	Facility name:	SHIPMAN	GENERATING STATION			
8 ft.	Facility address:		20 BANYAN DRIVE			
		HIT000610	899			
	Mailing address:	111000010	P.O. BOX 1027			
	<b>3</b>	HILO, HI 96	6721-1027			
	Contact:	DONN F FI	UKADA			
	Contact address:		Not reported			
		Not reporte	d			
	Contact country:		US			
	Contact telephone:		808-543-4525			
	Contact email:	Not reporte	d			
	EPA Region:	09 Drivete				
	Classification:	TSDE				
	Description:	Handler is e waste	engaged in the treatment, storage or disposal of hazard	lous		
	Owner/Operator Summa					
	Owner/operator name	ау.	HAWAILELEC LIGHT CO			
	Owner/operator addre	ess:	Not reported			
		Not reporte	ed .			
	Owner/operator count	try:	US			
	Owner/operator teleph	hone:	Not reported			
	Owner/operator email	1:	Not reported			
	Owner/operator fax:		Not reported			
	Owner/operator exten	Brivete	Νοι τεροπεα			
	Leyal Status. Owner/Operator Type	riivale	Owner			
	Owner/Operator Type		01/01/1920			
	Owner/Op end date:		Not reported			
	Owner/operator name	e:	HAWAII ELECTRIC LIGHT COMPANY, INC.			
	Owner/operator addre	ess:	Not reported			

Database(s)

EDR ID Number EPA ID Number

1007092162

	(	
	HI	
Owner/operator country	:	US
Owner/operator telepho	ne:	Not reported
Owner/operator email:		Not reported
Owner/operator fax:		Not reported
Owner/operator extension	on:	Not reported
Legal status:	Private	
Owner/Operator Type:		Operator
Owner/Op start date:		01/01/1920
Owner/Op end date:		Not reported
Handler Activities Summar	v.	
U.S. importer of hazardo	ous waste:	No
Mixed waste (haz. and r	adioactive):	No
Recycler of hazardous v	vaste:	No
Transporter of hazardou	is waste:	No
Treater, storer or dispos	er of HW:	No
Underground injection a	ctivity:	No
On-site burner exemption	on:	No
Furnace exemption:		No
Used oil fuel burner:		No
Used oil processor:		No
User oil refiner:		No
Used oil fuel marketer to	burner:	No
Used oil Specification m	arketer:	Yes
Used oil transfer facility:		No
Used oil transporter:		No
. Waste code:	D001	
. Waste name:	IGNITABLE	WASTE
. Waste code:	D006	
. Waste name:	CADMIUM	
. Waste code:	D008	
. Waste name:	LEAD	
Historical Generators:	aanay	10/05/1002
Site name:		
Classification:	Not a gonor	ectric LIGHT CO SHIFWAN GEN STE
Classification.	Not a gener	alor, vermeu
Date form received by a	igency:	07/29/1993
Site name:	HAWAII EL	ECTRIC LIGHT CO SHIPMAN GEN STE
Classification:	Not a gener	ator, verified
Facility Has Received Notic	ces of Violati	ons:
Regulation violated:		Not reported
Area of violation:		Generators - Pre-transport
Date violation determine	ed:	01/18/2008
Date achieved complian	ice:	09/03/2008
Violation lead agency:		State
Enforcement action:		WRITTEN INFORMAL
Enforcement action d	ate:	01/18/2008
Enf. disposition status	S:	Not reported
Enf. disp. status date	:	Not reported

#### SHIPMAN GENERATING STATION (Continued)

SHIPMAN GENERATING STATION (Continued)

MAP FINDINGS

Database(s)

EDR ID Number EPA ID Number

1007092162

	Enforcement lead Proposed penalty	agency: amount:	State Not reported		
	Paid penalty amount:     N       Regulation violated:     N       Area of violation:     0		Not reported		
			Not reported Generators - General		
	Date violation determ	nined:	01/18/2008		
	Date achieved comp	liance:	09/03/2008		
	Violation lead agency	y:	State		
	Enforcement actio	n:	WRITTEN INFORMAL		
	Enforcement actio	n date:	01/18/2008		
	Enf. disposition sta	atus:	Not reported		
	Enf. disp. status da	ate:	Not reported		
	Proposed penalty	agency.	Not reported		
	Final penalty amo	unt.	Not reported		
	Paid penalty amou	int:	Not reported		
	Evaluation Action Summ	nary:			
	Evaluation date:		09/26/2007		
	Evaluation:	COMPLIA	NCE EVALUATION INSPECTION ON-SITE		
	Area of violation:		Generators - General		
	Date achieved comp Evaluation lead ager	liance: ncy:	09/03/2008 State		
	Evaluation date:		09/26/2007		
	Evaluation:	COMPLIA	NCE EVALUATION INSPECTION ON-SITE		
	Area of violation:		Generators - Pre-transport		
	Date achieved comp	liance:	09/03/2008		
	Evaluation lead ager	icy:	State		
B9 West	WAIAKEA POND/HAWAI	IAN CANE PR	RDTS PLANT	SEMS	1000147193
1/4-1/2 0.435 mi.	HILO, HI 96720				HID9024004
2296 ft.	Site 1 of 2 in cluster B				
Relative: Higher	SEMS: Site ID:	000302			
Actual	EPA ID:	HID98240	0475		
19 ft.	Cong District:	2			
io iu	FIPS Code:	15001			
	Latitude:	Not report	ed		
	Longitude:	Not report	ed		
	FF:	N			
	NPL: Non NPL Status:	Not on the Other Clea	⊧ NPL anup Activity: State-Lead Cleanup		
	SEMS Detail:				
	Region:	9			
	Site ID:	900302	0475		
	EPA ID:				
		N			
		0			
	00.				
	Action Code:	SI			

HID982400475

HID Number:

Not reported

### MAP FINDINGS

Database(s)

EDR ID Number EPA ID Number

SEC:       1         Start Date:       3/26/1991         Quai:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA DD:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         OU:       0         Action Code:       PA         Action Name:       PA         SEC:       1         Start Date:       12/13/1989         Quai:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         OU:       0         Action Code:       DS         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         OU:       0         Action Code::       DS         Site ID:       10/15/13/1989         Qu		WAIAKEA POND/HAWAIIAN	I CANE PRDTS PLANT (Continued)	
Start Date:       Not reported         Finish Date:       3/26/1991         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA DD:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Name:       PA         Start Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Start DD:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         Oual:       H         Current Action Lead:       EPA Perf         Region:       9         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Name:       DISCVRY         SEC:       1         Start Date:       3/11/1988         Qua		SEQ:	1	
Finish Date:     3/26/1991       Quai:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       OU:     0       Action Code:     PA       Action Name:     PA       Action Code:     PA       Action Name:     1/21/31989       Quai:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       OU:     0       Action Code:     DS		Start Date:	Not reported	
Quai:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       OU:     0       Action Name:     PA       SEC:     1       Start Date:     12/13/1989       Quai:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Name:     DISCVRY       SEQ:     1       Start Date:     19/1988       Quai:     Not reported       Current Action Lead:     EPA Perf       Financial     Start Date:       35 KILAUEA AVE     HID982400.00.00.00       Hinthobate:     Sh1/1988       Qu		Finish Date:	3/26/1991	
Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Name:     PA       SEC:     1       Start Date:     12/13/1989       Qual:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Norme:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       POL:     9       OU:     0       Action Code:     DS       Action Code:     DS       Action Name:     DISC/RY       SEC:     1       Start Date:     1986-08-01 00:00:00       Finish Date:     8/1/1988       Qual:     Not reported       Current Action Lead:     EPA Perf       Financial     2361 ft.       Start Date:     1988-08-01 00:00:00       Finish Date:     8/1/1988       Qual:     Not reported       Action Code:     DS       2361 ft.     Site Zof 2 in cluster B <th></th> <th>Qual:</th> <th>Н</th> <th></th>		Qual:	Н	
Bise ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       OU:     0       Action Code:     PA       Action Code:     PA       SEQ:     1       Start Date:     Not reported       Finish Date:     12/13/1989       Qual:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Cade:     DSCVRY       SEQ:     1       Start Date:     10SCVRY       SEQ:     1		Current Action Lead:	EPA Perf	
Site D:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       OU:     0       Action Code:     PA       Action Name:     PA       SEQ:     1       Start Date:     Not reported       Finish Date:     12/13/1989       Qual:     H       Current Action Lead:     EPA Perf       Region:     9       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       Qui:     H       Current Action Lead:     EPA Perf       Region:     9       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       GU:     0       Action Code:     DS       Action Code:     Not reported       Current Action Lead:     EPA Perf       Financial     11/1988       Qual:     Not reported       Current Action Lead:     EPA Perf <th></th> <th>Region:</th> <th>9</th> <th></th>		Region:	9	
FPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPE:     N       GU:     0       Action Code:     PA       Action Name:     PA       SEQ:     1       Start Date:     12/13/1989       Qual:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Name:     DISCVRY       SEQ:     1       Start Date:     198-08-01 00:00:00       Finish Date:     81/1988       Qual:     Not reported       Current Action Lead:     EPA Perf		Site ID:	900302	
Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Code:     PA       Action Tame:     PA       SEQ:     1       Start Date:     Not reported       Finish Date:     12/13/1989       Qual:     H       Current Action Lead:     EPA Perf       Region:     9       Site ID:     900302       EPA ID:     HID982400475       Site Name:     WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT       NPL:     N       FF:     N       OU:     0       Action Code:     DS       Action Lead:     EPA Perf      B10       LARRY'S CHEVRON     West       835 KILAUEA AVE        1/4:1/2        HLO, H 196720      Financial Tation: Not reported        Current Action Lead:       EPA Perf      B10 LARRY'S CHEVRON  West 835 KILAUEA AVE 1/1988 <th></th> <th>EPA ID:</th> <th>HID982400475</th> <th></th>		EPA ID:	HID982400475	
NPL:       N         FF:       N         OU:       O         Action Name:       PA         Action Name:       PA         SEQ:       1         Star Date:       Not reported         Finish Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HIDB82400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Name:       DISC/RY         SEQ:       1         Start Date:       1988-06-01 00:00:00         Finish Date:       8//11988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         Financial         Interported         Current Action Lead:       EPA Perf         Financial         Financial         State         Organization:         Not reported		Site Name:	WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT	
FF:       N         OU:       0         Action Code:       PA         Action Name:       PA         SE0:       1         Start Date:       Not reported         Finish Date:       12/13/1989         Qua:       H         Current Action Lead:       EPA Perf         Region:       9         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         NPL:       N         VCI:       0         Action Code:       DS         Action Lead:       EPA Perf         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Quai:       Not reported         Current Action Lead:       EPA Perf         Fleative:       Start Date:         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         Acta		NPL:	Ν	
OU:       0         Action Code:       PA         Action Name:       PA         SEQ:       1         Start Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HID822400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Name:       DISC/RY         SEC:       1         Start Date:       1986-03-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         Torganization:         West       355 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         Torganization:         Vot reported         Actual:       Supplemental Location:         Supplemental Location:       Not reported         Facility Registry Identifier:       110013772471		FF:	N	
Action Code: PA Action Name: PA SEQ: 1 Start Date: Not reported Finish Date: 12/13/1989 Qual: H Current Action Lead: EPA Perf Region: 9 Site ID: 900302 EPA ID: HID982400475 Site Name: WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT NPL: N FF: N OU: 0 Action Code: DS Action Code: DS Action Code: DS Action Code: S Start Date: 1988-08-01 00:00:00 Finish Date: 8/1/1988 Qual: Not reported Current Action Lead: EPA Perf Start Date: 1988-08-01 00:00:00 Finish Date: 8/1/1988 Qual: Not reported Current Action Lead: EPA Perf Financial Start Date: Not reported Action Code: DS Action Name: DISCVRY SEQ: 1 Start Date: 1/1988 Qual: Not reported Current Action Lead: EPA Perf Financial Financial Financial Financial Financial Financial Financial Financial Financial Financial Current Action Lead: Not reported Actual: Supplemental Location: Not reported HID Number: Not repo		OU:	0	
Action Name:       PA         SEQ:       1         Start Date:       Not reported         Finish Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial       2361 ft.         Site 2 of 2 in cluster B       Financial         Relative:       SHWS:         Higher       Organization:         Not reported       Actual:         Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Progeram:		Action Code:	PA	
SEQ:       1         Start Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       903022         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial       Current Action Lead:         Zolafi ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:         Not reported       Actual:         Suplemental Location:       Not reported         Actual:       Suplemental Location:       Not reported         Havaii       Environmental Interest:       Larry's Kaikoo Chevron <t< th=""><th></th><th>Action Name:</th><th>PA</th><th></th></t<>		Action Name:	PA	
Start Date:       Not reported         Finish Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         Ziofi ft.       Site 2 of 2 in cluster         B10       LARRY'S CHEVRON         West       355 KILAUEA AVE         1/4-1/2       HLO, HI 96720         0.447 mi.       Supplemental Location:         Not reported       Actual:         Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Project Manag		SEQ:	1	
Finish Date:       12/13/1989         Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEC       1         Start Date:       9/1/1998         Qual:       Not reported         Current Action Lead:       EPA Perf         E10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental location:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER       Project Manager:         Project Manager:       Mark Sutterfield <th></th> <th>Start Date:</th> <th>Not reported</th> <th></th>		Start Date:	Not reported	
Qual:       H         Current Action Lead:       EPA Perf         Region:       9         Site ID:       90302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEC:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       81/11988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         Bio         LARRY'S CHEVRON         West       835 KILAUEA AVE         July Properted         Current Action Lead:       EPA Perf         Financial         SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Higher       Organization:       Not reported         Higher       State       Projecit Manager:		Finish Date:	12/13/1989	
Current Action Lead: EPA Perf  Region: 9 Site ID: 900302 EPA ID: HID982400475 Site Name: WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT NPL: N FF: N OU: 0 Action Code: DS Action Name: DISCVRY SEQ: 1 Start Date: 1998-08-01 00:00:00 Finish Date: 8/1/1988 Qual: Not reported Current Action Lead: EPA Perf  B10 LARRY'S CHEVRON West 835 KLIAUEA AVE 1/4-1/2 HLO, HI 96720 0.447 mi. Eative: SHWS: Higher Organization: Not reported Actual: Supplemental Location: Not reported Higher Organization: Not reported Actual: Supplemental Location: Not reported Higher Program: Not reported Facility Registry Identifier: 110013772471 Lead Agency: HEER Project Manager: Mark Sutterfield Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron Higher Project Manager: Mark Sutterfield Hazard Furioring: Not Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron Higher Project Manager: Mark Sutterfield Hazard Environmental Interest Name: Larry's Kaikoo Chevron		Qual:	H	
Region:       9         Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Stat Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SUpplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Hilb Number:       Not reported       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported       Facility Registry Identifier:         Project Manager:       Mark Sutterfield       Hazard Prioriy:		Current Action Lead:	EPA Perf	
Site ID:       900302         EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Stat Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SUpplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Hilb Number:       Not reported       Facility Registry Identifier:         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471 <t< th=""><th></th><th>Region:</th><th>9</th><th></th></t<>		Region:	9	
EPA ID:       HID982400475         Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/11988         Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         Z361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:         Organization:       Not reported         Actual:       Supplemental Location:         Supplemental Location:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Project Manager:       Mark Sutterfield         Hazard Priorit:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii      <		Site ID:	900302	
Site Name:       WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT         NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Financial       Bardi:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA<		EPA ID:	HID982400475	
NPL:       N         FF:       N         OU:       0         Action Code:       DS         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         I/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Facility Registry Identifier:       110013772471       Lead Agency:         Lead Agency:       HEER       Program:       State         Project Manager:       Mark Sutterfield       Hazard Priority:         Hazard Priority:       NFA       Potential Hazards And Controls:       No Hazard		Site Name:	WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT	
FF:       N         OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         Z361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         HD Number:       Not reported       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HD Number:       Not reported       Facility Registry Identifier:         Program:       State       Program:         Program:       State       Program:         Program:       State       Potential Hazards And Controls:         Potential Hazards And Controls:       Not Hazard		NPL:	N	
OU:       0         Action Code:       DS         Action Name:       DISCVRY         SEC:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:         SHWS:       Higher         Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported       Facility Registry Identifier:         110013772471       Lead Agency:       HEER         Program:       State       Program:         Program:       State       Program:         Program:       State       Program:         Program:       NFA       Potential Hazards And Controls:         Not Hazard       Hawaii       SDAB Environmental Interest:		FF:	N	
Action Code:       DS         Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         Financial         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         Z361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Location:       Not reported         Hawaii       Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported       Facility Registry Identifier:       110013772471         Lead Agency:       HEER       Program:       State         Program:       State       Program:       State         Program:       State       Program:       Not Hazard         Island:       Hawaii       Hazard Priority:       NFA         Potential Ha		OU:	0	
Action Name:       DISCVRY         SEQ:       1         Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported       Facility Registry Identifier:         HID Number:       Not reported       Facility Registry Identifier:         Program:       State       Project Manager:         Project Manager:       Mark Sutterfield       Hazard Priority:         Havaii       SDAB Environmental Interest: No Hazard       Island:         Island:       Hawaii       SDAB Environmental Interest Name: I arry's Kaikoo Chevron		Action Code:	DS	
SEQ: 1 Start Date: 1988-08-01 00:00:00 Finish Date: 8/1/1988 Qual: Not reported Current Action Lead: EPA Perf B10 LARRY'S CHEVRON West 835 KILAUEA AVE 1/4-1/2 HILO, HI 96720 0.447 mi. ShWS: Higher Organization: Not reported Actual: Supplemental Location: Not reported Actual: Supplemental Location: Not reported Higher Organization: Not reported Actual: Supplemental Interest: Larry's Kaikoo Chevron HID Number: Not reported Facility Registry Identifier: 110013772471 Lead Agency: HEER Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron		Action Name:	DISCVRY	
Start Date:       1988-08-01 00:00:00         Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         Actual:       Supplemental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest: Name: Larry's Kaikoo Chevron		SEQ:	1	
Finish Date:       8/1/1988         Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest: Name: Larry's Kaikoo Chevron		Start Date:	1988-08-01 00:00:00	
Qual:       Not reported         Current Action Lead:       EPA Perf         B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name' Larry's Kaikoo Chevron		Finish Date:	8/1/1988	
B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HD Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron		Qual:	Not reported	
B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii		Current Action Lead:	EPA Perf	
B10       LARRY'S CHEVRON         West       835 KILAUEA AVE         1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:         Not reported         Actual:       Supplemental Location:         19 ft.       Island:         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron				
1/4-1/2       HILO, HI 96720         0.447 mi.       Financial         2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	B10 West	LARRY'S CHEVRON		
0.447 mi. Financial 2361 ft. Site 2 of 2 in cluster B Relative: SHWS: Higher Organization: Not reported Actual: Supplemental Location: Not reported 19 ft. Island: Hawaii Environmental Interest: Larry's Kaikoo Chevron HID Number: Not reported Facility Registry Identifier: 110013772471 Lead Agency: HEER Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron	1/4-1/2			
2361 ft.       Site 2 of 2 in cluster B         Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	0.447 mi.			Financial
Relative:       SHWS:         Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	2361 ft.	Site 2 of 2 in cluster B		
Higher       Organization:       Not reported         Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	Relative:	SHWS:		
Actual:       Supplemental Location:       Not reported         19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	Higher	Organization:	Not reported	
19 ft.       Island:       Hawaii         Environmental Interest:       Larry's Kaikoo Chevron         HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron	Actual:	Supplemental Location:	Not reported	
Environmental Interest: Larry's Kaikoo Chevron HID Number: Not reported Facility Registry Identifier: 110013772471 Lead Agency: HEER Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron	19 ft.	Island:	Hawaii	
HID Number:       Not reported         Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron		Environmental Interest:	Larry's Kaikoo Chevron	
Facility Registry Identifier:       110013772471         Lead Agency:       HEER         Program:       State         Project Manager:       Mark Sutterfield         Hazard Priority:       NFA         Potential Hazards And Controls:       No Hazard         Island:       Hawaii         SDAB Environmental Interest Name: Larry's Kaikoo Chevron		HID Number:	Not reported	
Lead Agency: HEER Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name Larry's Kaikoo Chevron		Facility Registry Identifie	er: 110013//24/1	
Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron		Lead Agency:	HEEK	
Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron		Program:	State Mark Suttarfield	
Pazard Friding. NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAB Environmental Interest Name: Larry's Kaikoo Chevron				
Island: Hawaii SDAR Environmental Interest Name: Larry's Kaikoo Chevron		Potential Hazarda And C	Controls: No Hazard	
SDAR Environmental Interest Name I arry's Kaikoo Chevron		Island	Hawaii	
		SDAR Environmental In	terest Name: Larry's Kaikoo Chevron	

#### 1000147193

SHWS U001237010 LUST

UST Assurance

N/A

Database(s)

EDR ID Number EPA ID Number

### LARRY'S CHEVRON (Continued)

U001237010

F F F F C U U U U U U U	Facility Registry Identifie Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contamination Nature of Residual Cont Jse Restrictions: Engineering Control: Description of Restrictio Institutional Control: Within Designated Area	er: HEER ontrols: NFA Response N Response C n: tamination: ons: wide Contam	110013772471 No Hazard lecessary Complete Not reported Petroleum contaminated soil No Hazard Present for Unrestricted Residential Use Not reported Not reported Not reported
[	Document Date:	06/30/2004	No Further Action Letter - Offestificted Residential Ose
[	Document Number:	2004-252-M	
L F	Document Subject: Project Manager	Mark Sutter	NFA letter for Larry's Kilauea Chevron
(	Contact Information:		(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
1110	27.		
F	Facility ID:	9-601136	
F	acility Status:	Site Cleanu	p Completed (NFA)
F	-acility Status Date:	030044	09/07/2004
F	Project Officer:	Richard Tak	aba
119	T٠		
F () ()	Facility ID: Dwner: Dwner Address:	9-601136 CHEVRON 91-480 MAL	PRODUCTS COMPANY AKOLE ST. Hilo 96720 96720
Ĺ	_atitude:	19.716121	1110, 30720 30720
L	_ongitude:	-155.078374	4
ŀ	Horizontal Reference Da Horizontal Collection Me	atum Name: ethod Name:	GPS
٦	Fank ID:	R-1	
[	Date Installed:	07/17/1983	ly Out of Line
[	Date Closed:	08/20/2003	ly Out of Use
٦	Fank Capacity:	10000	
ę	Substance:	Gasoline	
٦	Fank ID:	R-2	
[	Date Installed:	07/17/1983	
ſ	Date Closed	08/20/2003	ly Out of Use
1	Fank Capacity:	10000	
ę	Substance:	Gasoline	
1	Fank ID:	R-3	
1	Fank Status:	Permanent	ly Out of Use

Database(s)

EDR ID Number EPA ID Number

#### LARRY'S CHEVRON (Continued) Date Closed: 08/20/2003 10000 Tank Capacity: Substance: Gasoline Tank ID: R-4 Date Installed: 07/17/1983 Tank Status: Permanently Out of Use Date Closed: 08/20/2003 Tank Capacity: 1000 Substance: Used Oil HI Financial Assurance: Alt Facility ID: 9-601136 Tank Id: R-1 Tank Status: Permanently Out of Use FRTYPE: Self Insured Expiration Date: Not reported Alt Facility ID: 9-601136 Tank Id: R-2 Tank Status: Permanently Out of Use FRTYPE: Self Insured

U001237010

11
ESE
1/4-1/2
0.452 mi.

2385 ft.

## HELCO PIPELINE RELEASE HUALANI HILO KANOELEHUA AVE & HUALANI ST HILO, HI 96720

Expiration Date:

Alt Facility ID:

Tank Status:

Expiration Date:

Alt Facility ID:

Tank Status:

Expiration Date:

Tank Id:

FRTYPE:

Tank Id:

FRTYPE:

**Relative:** SHWS: Higher Organization: Not reported Supplemental Location: Not reported Actual: 30 ft. Island: Hawaii Environmental Interest: HELCO Pipeline Release Hualani Hilo HID Number: Not reported Facility Registry Identifier: Not reported Lead Agency: HEER Program: State Project Manager: Not reported Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAR Environmental Interest Name: HELCO Pipeline Release Hualani Hilo

Not reported

Permanently Out of Use

Permanently Out of Use

9-601136

Self Insured

Not reported

9-601136

Self Insured

Not reported

R-3

R-4

SHWS S106817545 N/A

Map ID Direction			MAP FINDINGS		
Distance Elevation	Site		Dat	abase(s)	EDR ID Number EPA ID Number
	HELCO PIPELINE RELEAS	E HUALANI	HILO (Continued)		S106817545
	HID Number:	Not reporte	d		
	Facility Registry Identii	HFFR	Not reported		
	Potential Hazard And (	Controls:	No Hazard		
	Priority:	NFA			
	Assessment:	Response N	Necessary Complete		
	Nature of Contamination	on:	Found: Oil pipeline break		
	Nature of Residual Con	ntamination:	Not reported		
	Use Restrictions:		No Hazard Present For Unrestricted Residential Use		
	Engineering Control:	000-	Not reported		
	Institutional Control:	UIS.	Not reported		
	Within Designated Are	awide Contan	ni <b>Natioe</b> ported		
	Site Closure Type:		No Further Action Letter - Unrestricted Residential Use		
	Document Date:	02/16/2010			
	Document Number.	2010-123-6	NFA -Hualani Pipeline Release Removal Action Report	Hawaiian	
			Electric Light Company, Hilo Hawaii		
	Project Manager:	Not reported	d		
	Contact Information:		(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI	96782	
12 NW 1/4-1/2 0.456 mi. 2406 ft.	UST EXCAVATED BISHOP BISHOP ST AND KAMEHA HILO, HI 96720	AND KAMEH MEHA AVE	НАМЕНА	SHWS	S118943724 N/A
Relative:	SHW/S-				
Lower	Organization:	Not reporte	d		
Actual:	Supplemental Location	1:	Not reported		
4 ft.	Island:	Hawaii			
	Environmental Interest	: Not roporto	UST excavated Bishop and Kamehameha		
	Facility Registry Identif	ier:	Not reported		
	Lead Agency:	HEER			
	Program:	State			
	Project Manager:	John Peard			
	Potential Hazards And	Controls:	Hazard Undetermined		
	Island:	Hawaii			
	SDAR Environmental I HID Number:	nterest Name Not reporte	: UST excavated Bishop and Kamehameha d		
	Facility Registry Identif	HEER	Not reported		
	Potential Hazard And (	Controls:	Hazard Undetermined		
	Priority:	Low			
	Assessment:	Assessmen	t Ongoing		
	Response: Nature of Contamination	Not reporte	u Not reported		
	Nature of Residual Co	ntamination:	Not reported		
	Use Restrictions:		Undetermined		
	Engineering Control:		Not reported		
	Description of Restricti	ons:	Not reported		
	Within Designated Are	awide Contan	ni <b>hatiøe</b> ported		
	Site Closure Type:		Not reported		
	Document Date:	Not reporte	d		

Map ID Direction		MAP FINDINGS		
Elevation	Site		Database(s)	EPA ID Number
	UST EXCAVATED BISHOP	AND KAMEHAMEHA (Continued)		S118943724
	Document Number: Document Subject: Project Manager: Contact Information:	Not reported Not reported John Peard (808) 933-9921 Environmental Health Bldg, HI 96720	1582 Kamehameha Ave	ə, Hilo,
C13 NE 1/4-1/2 0.464 mi. 2449 ft	TESORO GAS EXPRESS 82 1672 KAMEHAMEHA AVE HILO, HI 96720 Site 1 of 2 in cluster C		LUST UST Financial Assurance	U003402964 N/A
2449 IL. Relative				
Actual: 9 ft.	Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-600708 Site Cleanup Completed (NFA) 06/19/2000 940057 Jeffrey Ung		
	UST: Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference Da Horizontal Collection Me	9-600708 Tesoro Refining & Marketing Company, LLC 3450 S. 344th Way, Suite 201 Hilo, 96720 96720 19.722237 -155.065577 atum Name: NAD83 ethod Name: GPS		
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-1 05/11/1956 <b>Permanently Out of Use</b> 04/17/1994 3000 Gasoline		
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-2 05/11/1956 <b>Permanently Out of Use</b> 04/17/1994 2000 Gasoline		
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-5 05/11/1956 <b>Permanently Out of Use</b> 04/17/1994 500 Used Oil		
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed:	r-87 04/01/1988 <b>Permanently Out of Use</b> 05/04/2005		

Database(s)

EDR ID Number EPA ID Number

#### **TESORO GAS EXPRESS 82 (Continued)**

-01	Sho das Expriess oz	(continued)
	Tank Capacity: Substance:	8000 Gasoline
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	r-92 04/01/1988 <b>Permanently Out of Use</b> 05/04/2005 8000 Gasoline
н	Financial Assurance: Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 r-87 Permanently Out of Use Other Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 r-92 Permanently Out of Use Guarantee Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 r-87 Permanently Out of Use Guarantee Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 R-5 Permanently Out of Use Other Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 R-2 Permanently Out of Use Other Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 R-2 Permanently Out of Use Guarantee Not reported
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-600708 R-1 Permanently Out of Use Guarantee Not reported
	Alt Eacility ID:	9-600708

Alt Facility ID: Tank Id: Tank Status: 9-600708 R-1 Permanently Out of Use

#### U003402964

Database(s)

EDR ID Number **EPA ID Number** 

U003402964

#### **TESORO GAS EXPRESS 82 (Continued)**

FRTYPE:	Other
Expiration Date:	Not reported
	0.000700
Alt Facility ID:	9-600708
Tank Id:	r-92
Tank Status:	Permanently Out of Use
FRTYPE:	Other
Expiration Date:	Not reported
Alt Facility ID:	9-600708

Tank Id:	R-5
Tank Status:	Permanently Out of Use
FRTYPE:	Guarantee
Expiration Date:	Not reported

#### C14 HARPER CAR & TRUCK RENTALS OF HAWAII NE **1690 KAMEHAMEHA AVE**

HILO, HI 96720 1/4-1/2 0.466 mi.

2460 ft.

#### Site 2 of 2 in cluster C

Relative:	LUST:	0.000/50
Lower	Facility ID:	9-603156
Actual:	Facility Status:	Site Cleanup Completed (NFA)
9 ft.	Facility Status Date:	06/24/2000
	Release ID:	960054
	Project Officer:	Richard Takaba

# UST:

Facility ID: 9-603156 Owner: Harper Car & Truck Rentals of Hawaii Owner Address: 4456 KALANIANAOLE AVE Hilo, 96720 96720 Owner City,St,Zip: Latitude: 19.722400 Longitude: -155.064895 Horizontal Reference Datum Name: NAD83 Horizontal Collection Method Name: Address Matching

Tank ID: Date Installed: Tank Status: Date Closed: Tank Capacity: Substance:

R-1 Not reported Permanently Out of Use 04/02/1996 1000 Diesel

Tank ID: R-2 Date Installed: Not reported Tank Status: Permanently Out of Use 04/02/1996 Date Closed: Tank Capacity: 8050 Substance: Gasoline

LUST U003222397 UST N/A

Database(s)

D15 SW 1/4-1/2 0.475 mi.	DUKE'S SHELL 1104 KILAUEA AVE. HILO, HI 96720		LUST UST Financial Assurance	U001237039 N/A
2506 11.	Sile 1 01 2 in cluster D			
Relative: Higher Actual: 23 ft.	LUST: Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer: Facility ID: Facility Status:	9-601320 Site Cleanup Completed (NFA) 09/18/2002 020029 Jose Ruiz 9-601320 Site Cleanup Completed (NFA)		
	Facility Status Date:	06/19/2002		
	Release ID: Project Officer:	930099 Jose Ruiz		
	UST:			
	Facility ID:			
	Owner:			
	Owner Address:	1132 BISHOP STREET, SUITE 1700		
	Latitude:	HIIO, 90720 90720 10 712473		
	Lande:	-155 077499		
	Horizontal Beference D	atum Name: NAD83		
	Horizontal Collection Me	ethod Name: Map		
	Tank ID <sup>.</sup>	1		
	Date Installed:	03/22/1990		
	Tank Status:	Currently in Use		
	Date Closed:	Not reported		
	Tank Capacity:	12000		
	Substance:	Gasohol		
	Tank ID:	2		
	Date Installed	2 03/22/1000		
	Tank Status:	Currently in Use		
	Date Closed:	Not reported		
	Tank Capacity:	12000		
	Substance:	Gasohol		
	Tank ID	2		
	Tarik ID. Data Installad	ა 03/02/1000		
	Tank Status:	Currently in Lies		
	Date Closed	Not reported		
	Tank Capacity	12000		
	Substance:	Diesel		
	Tank ID:	P 1		
	Tarik ID. Date Installed:	ח-ח 04/18/1072		
	Tank Statue	Permanently Out of Lise		
	Date Closed	03/22/1990		
	Tank Canacity	8000		
	Substance.	Gasoline		

Database(s)

EDR ID Number EPA ID Number

#### DUKE'S SHELL (Continued)

	u)
Tank ID:	R-2
Date Installed:	04/18/1972
<b>Tank Status:</b>	<b>Permanently Out of Use</b>
Date Closed:	03/22/1990
Tank Capacity:	6000
Substance:	Gasoline
Tank ID:	R-3
Date Installed:	04/18/1972
<b>Tank Status:</b>	<b>Permanently Out of Use</b>
Date Closed:	03/22/1990
Tank Capacity:	6000
Substance:	Gasoline
Tank ID:	R-4
Date Installed:	03/22/1990
<b>Tank Status:</b>	<b>Permanently Out of Use</b>
Date Closed:	04/04/2002
Tank Capacity:	550
Substance:	Used Oil
Tank ID:	R-4
Date Installed:	04/18/1972
<b>Tank Status:</b>	<b>Permanently Out of Use</b>
Date Closed:	03/22/1990
Tank Capacity:	550
Substance:	Used Oil
HI Financial Assurance: Alt Facility ID: Tank ld: Tank Status: FRTYPE: Expiration Date:	9-601320 R-2 Permanently Out of Use Not reported Not reported
Alt Facility ID:	9-601320
Tank Id:	R-4
Tank Status:	Permanently Out of Use
FRTYPE:	Not reported
Expiration Date:	Not reported
Alt Facility ID:	9-601320
Tank Id:	R-3
Tank Status:	Permanently Out of Use
FRTYPE:	Not reported
Expiration Date:	Not reported
Alt Facility ID:	9-601320
Tank Id:	R-1
Tank Status:	Permanently Out of Use
FRTYPE:	Not reported
Expiration Date:	Not reported
Alt Facility ID:	9-601320

#### U001237039

Database(s)

EDR ID Number EPA ID Number

### DUKE'S SHELL (Continued)

	7
Tank Id:	1
Tank Status:	Currently in Use
FRTYPE:	Not reported
Expiration Date:	Not reported
Alt Facility ID:	9-601320
Tank Id	3
Tank Statue:	Currently in Llse
	Not reported
FRITE.	Not reported
Expiration Date:	Not reported
	0.004000
Alt Facility ID:	9-601320
l ank ld:	2
Tank Status:	Currently in Use
FRTYPE:	Not reported
Expiration Date:	Not reported
•	·
Alt Facility ID:	9-601320
Tank Id:	R-2
Tank Status	Permanently Out of Lise
FRITE.	
Expiration Date:	09/15/2016
	0 601220
All Facility ID.	9-001320
Tank Status:	Currently in Use
FRTYPE:	Insurance
Expiration Date:	09/15/2016
Alt Facility ID:	9-601320
Tank ld:	R-3
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance
Expiration Date:	09/15/2016
Alt Facility ID:	9-601320
Tank Id:	R-1
Tank Status	Permanently Out of Use
FRTVPE	Insurance
Expiration Data:	
Expiration Date.	09/15/2010
Alt Eacility ID:	0-601320
Tank Id:	2
Tarik Otativa	
Tank Status:	Currently in Use
FRIYPE:	Insurance
Expiration Date:	09/15/2016
	0 601200
Alt Facility ID:	9-601320
Tank IO:	3
Tank Status:	Currently in Use
FRTYPE:	Insurance
Expiration Date:	09/15/2016
Alt Facility ID:	9-601320
I ank Id:	K-4
Tank Status:	Permanently Out of Use
FRTYPE:	Insurance

U001237039

Database(s)

	DUKE'S SHELL (Continue	ed)			U001237039
	Expiration Date:	09/15/2016			
D16 SW 1/4-1/2 0 478 mi	PACIFIC RENT-ALL, INC 1080 KILAUEA AVE HILO, HI 96720			LUST UST	U001237102 N/A
2523 ft.	Site 2 of 2 in cluster D				
Relative: Higher Actual: 23 ft.	LUST: Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-601678 Site Cleanup Completed (NFA) 11/07/1995 940099 Roger Brewer			
	UST: Facility ID: Owner: Owner Address: Owner City,St,Zip: Latitude: Longitude: Horizontal Reference Horizontal Collection N Tank ID: Date Installed: Tank Status: Date Closed: Tank Capacity: Substance: Tank Status: Date Closed: Tank Status: Date Closed: Tank Status: Date Closed: Tank Capacity: Substance:	9-601678 MASAMI & MAE M. AITO Not reported Hilo, 96720 96720 19.712573 -155.077293 Datum Name: NAD Method Name: Address Matching r-1 04/12/1973 Permanently Out of Use 03/04/1994 550 Gasoline r-1 04/12/1973 Permanently Out of Use 03/04/1994 550 Gasoline			
17 SE 1/4-1/2 0.498 mi. 2629 ft.	AIM HILO 761 KEKUANAOA ST HILO, HI 96720		Financial Ass	LUST UST surance	U001237016 N/A
Relative: Higher Actual: 27 ft.	LUST: Facility ID: Facility Status: Facility Status Date: Release ID: Project Officer:	9-601195 Site Cleanup Completed (NFA) 08/11/2008 050009 Josh Nagashima			
	UST: Facility ID:	9-601195			

Database(s)

EDR ID Number EPA ID Number

#### AIM HILO (Continued)

#### Owner: ALOHA PETROLEUM, LTD. 1132 BISHOP STREET, SUITE 1700 Owner Address: Owner City,St,Zip: Hilo, 96720 96720 Latitude: 19.711845 Longitude: -155.064567 Horizontal Reference Datum Name: NAD83 Horizontal Collection Method Name: GPS Tank ID: 87a Date Installed: 04/04/1985 **Currently in Use** Tank Status: Not reported Date Closed: Tank Capacity: 8000 Substance: Gasohol Tank ID: 92 Date Installed: 04/04/1985 Tank Status: **Currently in Use** Not reported Date Closed: Tank Capacity: 8000 Substance: Gasohol Tank ID: 98b Date Installed: 04/04/1985 Tank Status: **Currently in Use** Date Closed: Not reported 8000 Tank Capacity: Substance: Gasohol HI Financial Assurance: Alt Facility ID: 9-601195 Tank Id: 5 Tank Status: To be installed FRTYPE: Insurance Expiration Date: 04/01/2015 Alt Facility ID: 9-601195 Tank Id: 6 Tank Status: To be installed FRTYPE: Insurance Expiration Date: 04/01/2015 Alt Facility ID: 9-601195 Tank Id: 87a Currently in Use Tank Status: FRTYPE: Insurance Expiration Date: 04/01/2015 Alt Facility ID: 9-601195 Tank Id: 92 Tank Status: Currently in Use FRTYPE: Insurance 04/01/2015 Expiration Date: Alt Facility ID: 9-601195

#### U001237016

HID Number:

Not reported

### MAP FINDINGS

Database(s)

	AIM HILO (Continued)				U001237016
	Tank ld: Tank Status: FRTYPE: Expiration Date:	98b Currently ir Insurance 04/01/2015	n Use		
	Alt Facility ID: Tank Id: Tank Status: FRTYPE: Expiration Date:	9-601195 4 To be insta Insurance 04/01/2015	ulled		
18 SW 1/2-1 0.524 mi. 2766 ft.	HILO SHOPPING CENTER 1255 KILAUEA AVE HILO, HI 96720			SHWS SPILLS	S106817730 N/A
Relative: Higher	SHWS: Organization:	Not reporte	ed		
Actual: 35 ft.	Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi	: Hawaii Not reporte er:	Not reported Hilo Shopping Center ed Not reported		
	Lead Agency: Program: Project Manager: Hazard Priority:	HEER State Mark Sutte NFA	rfield		
	Potential Hazards And I Island: SDAR Environmental Ir	Controls: Hawaii nterest Name	No Hazard e: Hilo Shopping Center		
	Facility Registry Identific	er: HEER	Not reported		
	Potential Hazard And C Priority:	Controls:	No Hazard		
	Assessment:	Response	Necessary		
	Response:	Response	Complete		
	Nature of Residual Con	itamination:	Petroleum contaminated soil		
	Use Restrictions:		No Hazard Present for Unrestricted Residential Use		
	Engineering Control: Description of Bestrictic	ons:	Not reported		
	Institutional Control:	5110.	Not reported		
	Within Designated Area	awide Contar	mi <b>Natioe</b> ported		
	Site Closure Type: Document Date:	10/03/2005	No Further Action Letter - Unrestricted Residential Use		
	Document Number:	2005-508-	MS		
	Document Subject:		NFA for 550-gallon diesel UST		
	Project Manager: Contact Information:	Mark Sutte	(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI	96782	
	HI SPILLS:				
	Island:	Hawaii			
	Supplemental Loc. Text	t: 20040510-	Not reported 1040		

Database(s)

EDR ID Number EPA ID Number

#### HILO SHOPPING CENTER (Continued)

KHI INC. DBA BAYSIDE CHEVRON

774 KAMEHAMEHA AVE

HILO, HI 96720

Facility Registry Id: Not reported Lead and Program: HEER EP&R ER: No Units: Hilo Shopping Center non-regulated UST release Substances: **Diesel Fuel** Less Or Greater Than: < 25 Numerical Quantity: Units: Gallons Activity Type: Response Activity Lead: Liz Galvez Assignment End Date: Not reported Result: Refer to ISST Hilo Shopping Center File Under: Latitude: 19.710069 Longitude: -155.076339 Island: Hawaii Supplemental Loc. Text: Not reported 20040510-1040 Case Number: HID Number: Not reported Facility Registry Id: Not reported HEER EP&R Lead and Program: ER: No Units: Hilo Shopping Center non-regulated UST release Substances: Diesel Fuel Less Or Greater Than: < Numerical Quantity: 25 Units: Gallons Activity Type: Response Activity Lead: Liz Galvez Assignment End Date: Not reported Result: Refer to ISST Hilo Shopping Center File Under: Latitude: 19.66932 -155.307075 Longitude:

#### S106817730

U001237007

LUST N/A

SHWS

UST

SPILLS

**INST CONTROL** 

NW 1/2-1 0.528 mi. 2786 ft.

19

**Financial Assurance Relative:** Lower SHWS: Organization: Not reported Actual: Supplemental Location: Kamehameha and Pauahi Street, SE corner 4 ft. Island: Hawaii Environmental Interest: **Bayside Chevron Service** HID Number: Not reported Facility Registry Identifier: 110013783646 Lead Agency: HEER Program: State Project Manager: Anna Fernandez Hazard Priority: NFA Potential Hazards And Controls: Hazard Managed With Controls Island: Hawaii SDAR Environmental Interest Name: Bayside Chevron Service HID Number: Not reported

Database(s)

EDR ID Number EPA ID Number

#### KHI INC. DBA BAYSIDE CHEVRON (Continued)

U001237007

	Facility Registry Identifie	er:	110013783646
	Lead Agency:	HEER	Lissand Managard With Controls
	Potential Hazard And Co		Hazard Managed With Controls
	Assessment	Response N	lacassary
	Response:	Response (	Complete
	Nature of Contamination	1:	Found: TPH-O of 0.736 ma/l in groundwater in MW-3
	Nature of Residual Cont	amination:	Subsurface soil with TPH-G, UH-d, UH-o and total xylene concentrations exceeding HDOH EALs remains on site 3 feet below the station building.
	Use Restrictions:		Controls Required to Manage Contamination
	Engineering Control:		Not reported
	Description of Restrictio	ns:	A soil management plan is required.
	Institutional Control:		Government - Hawaii Dept. of Health Letter Issued
	Within Designated Area	wide Contarr	i <b>Natioe</b> ported
	Site Closure Type:		No Further Action Letter - Restricted Use
	Document Date:	04/27/2007	
	Document Number:	2007-269-A	F
	Document Subject:		No Further Action with Institutional Controls Determination
	Project Manager:	Anna Ferna	ndez
	Contact Information:		(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
LL	JST:		
	Facility ID:	9-601133	
	Facility Status:	Site Cleanu	p Completed (NFA)

Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	02/01/1999
Release ID:	970106
Project Officer:	Richard Takaba
Facility ID:	9-601133
Facility Status:	Site Cleanup Completed (NFA)
Facility Status Date:	04/20/2004
Release ID:	040017

**Richard Takaba** 

UST:

Project Officer:

Facility ID:	9-601133
Owner:	KHI dba Bayside Chevron
Owner Address:	774 Kamehameha Ave
Owner City,St,Zip:	Hilo, 96720 96720
Latitude:	19.721900
Longitude:	-155.078450
Horizontal Reference Da	atum Name: NAD83
Horizontal Collection Me	ethod Name: GPS

Tank ID:
Date Installed:
Tank Status:
Date Closed:
Tank Capacity:
Substance:

1 08/21/1983 Currently In Use Not reported 10000 Gasoline

Tank ID:	2
Date Installed:	08/21/1983
Tank Statue:	Ourseman the line line a
Tank Status.	Currently in Use

Database(s)

EDR ID Number EPA ID Number

# KHI INC. DBA BAYSIDE CHEVRON (Continued)

	Tank Capacity: Substance:	10000 Gasohol	
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	3 08/21/1983 <b>Currently Ir</b> Not reported 10000 Gasohol	n Use
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-005 08/20/1969 <b>Permanent</b> 09/01/1983 1000 Used Oil	ly Out of Use
	Tank ID: Date Installed: <b>Tank Status:</b> Date Closed: Tank Capacity: Substance:	R-4 08/21/1983 <b>Permanent</b> 04/03/1997 1000 Used Oil	ly Out of Use
IN	ST CONTROL: Potential hazards and co Supplemental Location: Zip Suffix: Island: Institutional Control:	ontrols: Not reportec Hawaii	Hazard Managed With Controls Kamehameha and Pauahi Street, SE corner d Government - Hawaii Dept. of Health Letter Issued
н	SPILLS: Island: Supplemental Loc. Text Case Number: HID Number: Facility Registry Id: Lead and Program: ER: Units: Substances: Less Or Greater Than: Numerical Quantity: Units: Activity Type: Activity Lead: Assignment End Date: Result: File Under: Latitude: Longitude:	Hawaii 20040629-1 Not reported Bayside Che Not reported Not reported Response Mike Cripps Refer to ISS Chevron Pro 19.66932 -155.307075	Kamehameha and Pauahi Street, SE corner 542 110013783646 HEER EP&R d evron Contaminated Soil Not reported Not reported 1 2005-08-30 00:00:00 T oducts Company
	Island:	Hawaii	

EDR ID Number Database(s) EPA ID Number

# KHI INC. DBA BAYSIDE CHEVRON (Continued)

	Supplemental Loc. Text	: Kamehameha and Pauahi Street, SE corner
	Case Number:	20040629-1542
	HID Number:	Not reported
	Facility Registry Id:	110013783646
	Lead and Program:	HEER EP&R
	ER:	Not reported
	Units:	Bayside Chevron Contaminated Soil
	Substances:	Not reported
	Less Or Greater Than:	Not reported
	Numerical Quantity:	Not reported
	Units:	Not reported
	Activity Type:	Response
	Activity Lead:	Mike Cripps
	Assignment End Date:	2005-08-30 00:00:00
	Result:	Refer to ISST
	File Under:	Chevron Products Company
	Latitude:	19.722126
	Longitude:	-155 079456
н	Financial Assurance:	
	Alt Facility ID:	9-601133
	Tank Id:	1
	Tank Status:	Currently In Use
	FRTYPE:	Insurance
	Expiration Date:	05/09/2016
	Alt Facility ID:	9-601133
	Tank ld:	2
	Tank Status:	Currently In Use
	FRTYPE:	Insurance
	Expiration Date:	05/09/2016
	Alt Facility ID:	9-601133
	Tank Id:	3
	Tank Status:	Currently In Use
	FRTYPE:	Insurance
	Expiration Date:	05/09/2016
	Alt Facility ID:	9-601133
	Tank Id:	R-005
	Tank Status:	Permanently Out of Use
	FRTYPE:	Insurance
	Expiration Date:	05/09/2016
	Alt Facility ID	9-601133
	Tank Id:	B-4
	Tank Status	Permanently Out of Use
	FRTYPE	Insurance
	Expiration Date:	05/09/2016
	Expiration Date.	000012010

#### U001237007

Database(s)

20 SE 1/2-1 0.636 mi. 3356 ft.	STATIONERS CORPORATIO 708 KANOELEHUA AVE HILO, HI 96720	ON OF HAW	All	SHWS SPILLS	S108009231 N/A
Relative: Higher Actual: 29 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifie Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And C Island: SDAR Environmental In: HID Number: Facility Registry Identifie Lead Agency: Potential Hazard And Co Priority: Assessment: Response: Nature of Contamination Nature of Residual Cont Use Restrictions: Engineering Control: Description of Restrictio Institutional Control: Within Designated Areau Site Closure Type: Document Date: Document Subject: Project Manager:	Not reported Hawaii Not reported er: HEER State Clarence Ca NFA Controls: Hawaii terest Name: Not reported er: HEER ontrols: NFA Response N Response Contain amination: ns: wide Contain 12/09/2005 2005-637-C. Clarence Ca	ESA Limited Phase II Investigation Stationers Corporation of Hawaii Not reported lihan No Hazard Stationers Corporation of Hawaii Not reported Not reported No Hazard eccessary complete Not reported Not reported No Further Action Letter - Unrestricted Residential Use AC Review of the Limited Phase II ESA lihan	067700	
	HI SPILLS: Island: Supplemental Loc. Text Case Number: HID Number: Facility Registry Id: Lead and Program: ER: Units: Substances: Less Or Greater Than: Numerical Quantity: Units: Activity Type: Activity Type: Activity Lead: Assignment End Date: Result: File Under:	Hawaii 20051123-0 Not reported Building Mat Unknown Not reported Response Curtis Martin SOSC NFA Stationers C	ESA Limited Phase II Investigation 823 Not reported HEER EP&R rerials Survey - Typewriter Cleaning Station Not reported Not reported 2005-11-23 00:00:00		

### MAP FINDINGS

Database(s)

	STATIONERS CORPORATION OF HAWAII (Continued)			S108009231		
	Latitude:	19.66932				
	Longitude:	-155.30707	75			
	Island:	Hawaii				
	Supplemental Loc. Tex	t:	ESA Limited Phase II Investigation			
	Case Number:	20051123-0	0823			
	HID NUMber:	Not reporte	Net reported			
	Facility Registry Id.					
	Eeau and Flogram.	No				
	Linits:	Building Ma	aterials Survey - Typewriter Cleaning Station			
	Substances:	Unknown				
	Less Or Greater Than:	0	Not reported			
	Numerical Quantity:		Not reported			
	Units:	Not reporte	ed			
	Activity Type:	Response				
	Activity Lead:	Curtis Mart	in			
	Assignment End Date:		2005-11-23 00:00:00			
	Result:	SOSC NFA				
	File Under:	Stationers	Corporation of Hawaii			
	Latitude:	19.709235				
	Longitude.	-155.06470	J4			
0.655 mi. 3459 ft.						
Relative:	SHWS:					
Lower	Organization:	Not reporte				
Actual:	Supplemental Location.	Hawaii				
511.	Environmental Interest	Tawan	HELCO Shipman Plant Bunker Fuel Line			
	HID Number:	Not reporte	ed			
	Facility Registry Identifi	er:	Not reported			
	Lead Agency:	HEER				
	Program:	State				
	Project Manager:	Amelia Hic	ks			
	Hazard Priority:	NFA Controlo:	No Llozord			
	Potential Hazards And	Hawaii	No Hazaro			
	SDAB Environmental Ir	iterest Name	e: HELCO Shinman Plant Bunker Fuel Line			
	HID Number:	Not reporte				
	Facility Registry Identifi	er:	Not reported			
	Lead Agency:	HEER				
	Potential Hazard And C	ontrols:	No Hazard			
	Priority:	NFA				
	Assessment:	Response	Necessary			
	Response:	Response	Complete			
	Nature of Contaminatio	11. tamination	TPH detected at maximum concentrations of 1 900 mg/	ka (helow 9	tata	
	Mature of Hestudal COI	anniai011.	Unrestricted Tier 2 Environmental Action Levels (HDOF	FALS) No	lato	
			indications of leaks or other structural failures along the	pipeline		
			and the excavated area was backfilled.			
	Use Restrictions:		No Hazard Present For Unrestricted Residential Use			
	Engineering Control:		Not reported			
	Description of Restriction	ons:	Not reported			

Map ID Direction			MAP FINDINGS			
Distance Elevation	Site				Database(s)	EDR ID Number EPA ID Number
	HELCO PIPELINE ANOMAL	Y AT NORTH	IEAST SIDE OF SEASIDE HOTEL (Cont	inued)		S111677284
	Institutional Control: Within Designated Area	wide Contam	Not reported i <b>Natiøe</b> ported			
	Site Closure Type:	07/16/2012	No Further Action Letter - Unrestricted Res	sidential L	Jse	
	Document Number:	2012-433-A	4			
Document Subject: No Further Action Determination for HELCO Shipman Plant Bunker I Line				Fuel		
	Project Manager:	Amelia Hick	3			
	Contact Information:		(808) 586-4249 2385 Waimano Home Rd,	Pearl City	y, HI 96782	
	HI SPILLS:					
	Island:	Hawaii				
	Supplemental Loc. Text	:	Seaside Hotel			
	Case Number:	20100323-1 Not reported	047			
	Facility Begistry Id:	Not reported	Not reported			
	Lead and Program:		HEER EP&R			
	ER:	None				
	Units:	HELCO Shi	oman Plant Bunker Fuel Line			
	Substances:	Diesel Fuel	Bunker			
	Less Or Greater Than:		Not reported			
	Numerical Quantity:	o "	25			
	Units:	Gallons				
		Response				
	Assignment End Date:	LIZ Galvez	Not reported			
	Result:	Not reported				
	File Under:	Hawaii Elec	ric Liaht Co., Inc. (HELCO)			
	Latitude:	Not reported				
	Longitude:	Not reported				
	Island:	Hawaii				
	Supplemental Loc. Text	:	Seaside Hotel			
	Case Number:	20100323-1	655			
	HID Number:	Not reported	Not reported			
	Facility Registry Id:					
	FB <sup>.</sup>	None				
	Units:	HELCO pipe	line anomaly			
	Substances:	Bunker and	Diesel			
	Less Or Greater Than:		<			
	Numerical Quantity:		25			
	Units:	Gallons				
	Activity Type:	Response				
	Activity Lead:	Liz Galvez	Not see a de d			
	Assignment End Date:	Not reported	потеропеа			
	File I Inder:	Hawaii Elec	ric Light Co., Inc. (HELCO)			
	l atitude:	Not reported				
	Longitude:	Not reported				
	5					

Database(s)

22 WSW 1/2-1 0.683 mi. 3604 ft.	SUN SUN LAU CHOP SUEY 1055 KINOOLE ST HILO, HI 96720	' HOUSE		SHWS SPILLS	S106820539 N/A
Relative:	SHWS:				
Higher	Organization:	Not reporte	d		
Actual:	Supplemental Location:		Not reported		
48 ft.	Island:	Hawaii			
	Environmental Interest:		Sun Sun Lau Chop Suey House (Report)		
	HID Number:	Not reporte	d		
	Facility Registry Identified	er:	110013778279		
	Lead Agency:	HEER			
	Program:	State			
	Project Manager:	Mark Sutter	field		
	Hazard Priority:	NFA	N. 11 .		
	Potential Hazards And	Controls:	No Hazard		
	Island:	Hawall			
	HID Number:	Not reporte	d		
	Facility Registry Identify	er:	110013778279		
	Lead Agency:	HEER	Nollozard		
	Potential Hazard And C		NO Hazard		
	Assessment:	NFA Rosponso I	Necessary		
	Response	Response (	Complete		
	Nature of Contaminatio	n.	Not reported		
	Nature of Residual Con	tamination:	Petroleum contaminated soil		
	Use Restrictions:		No Hazard Present for Unrestricted Residential Use		
	Engineering Control:		Not reported		
	Description of Restriction	ons:	Not reported		
	Institutional Control:		Not reported		
	Within Designated Area	wide Contan	ni <b>Natiøe</b> ported		
	Site Closure Type:		No Further Action Letter - Unrestricted Residential Use		
	Document Date:	04/28/2005			
	Document Number:	2005-223-N	AS		
	Document Subject:		NFA for diesel UST release		
	Project Manager:	Mark Sutter	Tield (000) 506 4040 0005 Weimens Hame Del Dearl City III	00700	
	Contact mormation.		(606) 560-4249 2365 Wainland Home Ru, Fean City, His	90702	
	HI SPILLS:				
	Island:	Hawaii			
	Supplemental Loc. Text	t:	Not reported		
	Case Number:	19951212-2	2		
	HID Number:	Not reporte	d		
	Facility Registry Id:		110013778279		
	Lead and Program:	<b>.</b>	HEER EP&R		
	ER:	Not reporte			
	Units:	Sun Sun La	iu, Lta.		
	Substances.	Diesei Fuei	Not reported		
	Numerical Quantity:		150		
	Units	Gallons			
	Activity Type:	Response			
	Activity Lead:	Bill Perrv			
	Assignment End Date:		Not reported		
	Result:	Refer to ISS	ST		
	File Under:	Sun Sun La	au Chop Suey House		

MAP FINDINGS

Database(s)

EDR ID Number EPA ID Number

S106820539

Latitude:	19.66932
Longitude:	-155.307075
Latitude:	19.66932
Longitude:	-155.307075
Island:	Hawaii
Supplemental Loc. Text	Not reported
Case Number:	19951212-2
HID Number:	Not reported
Facility Registry Id:	110013778279
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Sun Sun Lau, Ltd.
Substances:	Diesel Fuel
Less Or Greater Than:	Not reported
Numerical Quantity:	150
Units:	Gallons
Activity Type:	Response
Activity Lead:	Bill Perry
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Sun Sun Lau Chon Suey House
Latitude:	19.712697
Longitude:	-155.081073

E23 West 1/2-1 0.717 mi.	HILO QUALITY WASHERE 210 HOKU ST HILO, HI 96720 Site 1 of 2 in eluptor 5	ETTE		SHWS INST CONTROL SPILLS	1006820674 N/A
3700 IL.	Site 1 of 2 in cluster E				
Relative:	SHWS:				
Higner	Organization:	Not reporte	ed		
Actual:	Supplemental Locatio	n:	Not reported		
58 ft.	Island:	Hawaii	Lile Quelity Weekerette		
		il. Not reporte			
	Fild Nulliber.	ifior:	110012786741		
		HEER	110013780741		
	Program:	State			
	Project Manager:	Eric Sadov	rama		
	Hazard Priority:	Low			
	Potential Hazards And	d Controls:	Hazard Managed With Controls		
	Island:	Hawaii	-		
	SDAR Environmental Interest Name: Hilo Quality Washerette				
	HID Number: Not reported				
	Facility Registry Identifier:		110013786741		
	Lead Agency:	HEER			
	Potential Hazard And	Controls:	Hazard Managed With Controls		
	Priority:	Low			
	Assessment:	Response	Necessary		
	Response:	Response	Ongoing		
	Nature of Contamination:		Found: Diesel in soil		
	Nature of Residual Contamination:		Not reported		
	Use Restrictions:		Not reported		
	Engineering Control:		Not reported		
	Institutional Control:		Government - Hawaii Dent of Health Letter Iss	ued	
	Within Designated Areawide Contar		millatinenorted		
	Site Closure Type		Not reported		
	ene energie . ype.				

Database(s)

EDR ID Number EPA ID Number

#### **HILO QUALITY WASHERETTE (Continued)** 1006820674 Document Date: Not reported Document Number: Not reported Document Subject: Not reported Project Manager: Eric Sadoyama Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782 INST CONTROL: Potential hazards and controls: Hazard Managed With Controls Supplemental Location: Not reported Zip Suffix: Not reported Island: Hawaii Institutional Control: Government - Hawaii Dept. of Health Letter Issued HI SPILLS: Island: Hawaii Supplemental Loc. Text: Not reported 19960110-1425 Case Number: HID Number: Not reported 110013786741 Facility Registry Id: Lead and Program: HEER EP&R ER: No Units: Hilo Quality Washerette oil tank leaking diesel #2 Substances: Diesel Fuel #2 Less Or Greater Than: Not reported Numerical Quantity: 200 Units: Gallons Activity Type: Response Activity Lead: Not reported Assignment End Date: Not reported Result: Refer to ISST Hilo Quality Washerette File Under: Latitude: 19.66932 Longitude: -155.307075 Island: Hawaii Supplemental Loc. Text: Not reported 19960110-1425 Case Number: HID Number: Not reported 110013786741 Facility Registry Id: Lead and Program: HEER EP&R ER: No Units: Hilo Quality Washerette oil tank leaking diesel #2 Diesel Fuel #2 Substances: Less Or Greater Than: Not reported Numerical Quantity: 200 Units: Gallons Activity Type: Response Activity Lead: Not reported Assignment End Date: Not reported Result: Refer to ISST File Under: Hilo Quality Washerette Latitude: 19.715372 Longitude: -155.08253 Island: Hawaii Supplemental Loc. Text: Not reported

Database(s)

EDR ID Number EPA ID Number

#### **HILO QUALITY WASHERETTE (Continued)**

Case Number: 19960124-0225 HID Number: Not reported Facility Registry Id: 110013786741 Lead and Program: HEER EP&R ER: Not reported Units: Hilo Quality Washerette tank leaking diesel Diesel Fuel Substances: Less Or Greater Than: Not reported Numerical Quantity: 200 Units: Gallons Activity Type: Response Activity Lead: **Terry Corpus** Assignment End Date: Not reported Result: Refer to ISST File Under: Hilo Quality Washerette Latitude: 19.715372 -155.08253 Longitude: Island: Hawaii Supplemental Loc. Text: Not reported Case Number: 19960124-0225 HID Number: Not reported Facility Registry Id: 110013786741 Lead and Program: HEER EP&R ER: Not reported Hilo Quality Washerette tank leaking diesel Units: Substances: **Diesel Fuel** Less Or Greater Than: Not reported Numerical Quantity: 200 Units: Gallons Activity Type: Response Activity Lead: **Terry Corpus** Assignment End Date: Not reported Result: Refer to ISST File Under: Hilo Quality Washerette Latitude: 19.66932 Longitude: -155.307075

E24 West 1/2-1 0.760 mi. 4011 ft.	HILO QUALITY CLEANER 865 KINOOLE ST HILO, HI 96720 Site 2 of 2 in cluster E	S	RCRA-CESQG SHWS SPILLS FINDS ECHO	1004688848 HID982436487
Relative:			AIRS	
Higher	RCRA-CESQG:			
Actual:	Date form received by	agency: 10/26/1990		
64 ft.	Facility name:	HILO QUALITY CLEANERS		
	Facility address:	865 KINOOLE ST		
		HILO, HI 96720		
	EPA ID:	HID982436487		
	Mailing address:	KINOOLE ST		
		HILO, HI 96720		
	Contact:	RONALD JOHNSON		
	Contact address:	865 KINOOLE ST		
		HILO, HI 96720		
	Contact country:	US		
	Contact telephone:	808-935-1620		

#### 1006820674

Database(s)

EDR ID Number EPA ID Number

1004688848

# HILO QUALITY CLEANERS (Continued)

Contact email: Not repo EPA Region: 09 Classification: Condition Description: Handler: month, a or gener. month, a waste; o other del land or w of any re from the hazardou time: 1 k any resid the clear hazardou	nally Exempt Small Quantity Generator generates 100 kg or less of hazardous waste per calendar nd accumulates 1000 kg or less of hazardous waste per calendar nd accumulates 1000 kg or less of hazardous waste per calendar nd accumulates at any time: 1 kg or less of acutely hazardous r 100 kg or less of any residue or contaminated soil, waste or orisr sesulting from the cleanup of a spill, into or on any vater, of acutely hazardous waste; or generates 100 kg or less sidue or contaminated soil, waste or other debris resulting cleanup of a spill, into or on any land or water, of acutely us waste during any calendar month, and accumulates at any g or less of acutely hazardous waste; or 100 kg or less of due or contaminated soil, waste or other debris resulting from hup of a spill, into or on any land or water, of acutely us waste
Owner/Operator Summary:	
Owner/operator name:	HILO QUALITY CLEANERS
Owner/operator address:	NOT REQUIRED
NOT RE	QUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	415-555-1212
Owner/operator email:	Not reported
Owner/operator fax:	Not reported
Owner/operator extension:	Not reported
Legal status: Private	
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported
Owner/operator zeros	
Owner/operator address:	
NUT RE	Not reported
Owner/operator tolophono:	A15-555-1010
Owner/operator email:	410-000-1212 Not reported
Owner/operator fay:	Not reported
Owner/operator extension:	Not reported
Legal status: Private	Notrepolieu
Owner/Operator Type	Operator
Owner/On start date:	Not reported
Owner/Op and date:	Not reported
Under Activities Comments	ινοι Γεροπεα
II 9 importor of bozordous wests	· No
Mixed waste (baz, and redisactive	α)· Νο
Becycler of bazardous waste	≂). No
Transporter of bazardous waste:	No
Treater storer or disposer of HW	No
Underground injection activity:	No
On-site humar exemption:	
Furnace exemption:	NO
	No
Used oil fuel burner	NO NO NO
Database(s)

EDR ID Number EPA ID Number

### 1004688848

HILO QUALITY CLEANERS (Continued) User oil refiner: No Used oil fuel marketer to burner: No Used oil Specification marketer: No Used oil transfer facility: No Used oil transporter: No Violation Status: No violations found SHWS: Organization: Not reported Supplemental Location: Not reported Island: Hawaii Environmental Interest: Hilo Quality Cleaners HID Number: Not reported Facility Registry Identifier: 110005726526 Lead Agency: HEER Program: State Project Manager: Ross Kuge Hazard Priority: NFA Potential Hazards And Controls: Hazard Undetermined Island: Hawaii SDAR Environmental Interest Name: Hilo Quality Cleaners HID Number: Not reported Facility Registry Identifier: 110005726526 Lead Agency: HEER Potential Hazard And Controls: Hazard Undetermined Priority: NFA Assessment: Response Necessarv Response: **Response Complete** Presumed: Unknown Nature of Contamination: Nature of Residual Contamination: Unknown Use Restrictions: Undetermined Engineering Control: Not reported Description of Restrictions: Not reported Institutional Control: Not reported Within Designated Areawide ContamiNatioeported Site Closure Type: Historic NFA - Incomplete Documentation Document Date: 07/17/1997 Document Number: 1997-250-RK Document Subject: Hazardous Waste Release Response Determination for Hilo Quality Cleaners, Facility at 865 Kinoole St, Hilo HI Project Manager: Ross Kuge Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782 HI SPILLS: Island: Hawaii Supplemental Loc. Text: Not reported 19971018-1909 Case Number: HID Number: Not reported Facility Registry Id: 110005726526 Lead and Program: HEER EP&R ER: Not reported Units: Hilo Quality Cleaners Diesel Spill Substances: Diesel Fuel Less Or Greater Than: Not reported Numerical Quantity: 30 Units: Gallons

Database(s)

EDR ID Number EPA ID Number

# HILO QUALITY CLEANERS (Continued)

Activity Type: Activity Lead: Assignment End Date:	Response Bill Perry	Not reported
Regult.		Not reported
File Under:	Hilo Quality	Cleaners
Latituda:	10 Guanty	Cleaners
Lanuue.	155 20707	-
Longitude.	-155.507073	
Island:	Hawaii	
Supplemental Loc. Text		Not reported
Case Number:	19971018-1	909
HID Number:	Not reported	k
Facility Registry Id:		110005726526
Lead and Program:		HEER EP&R
ER:	Not reported	Ł
Units:	Hilo Quality	Cleaners Diesel Spill
Substances:	Diesel Fuel	
Less Or Greater Than:		Not reported
Numerical Quantity:		30
Units:	Gallons	
Activity Type:	Response	
Activity Lead:	Bill Perry	
Assignment End Date:		Not reported
Result:	SOSC NFA	
File Under:	Hilo Quality	Cleaners
Latitude:	19.715911	
Longitude:	-155.082942	2
Island:	Hawaii	
Supplemental Loc. Text	:	Not reported
Case Number:	19940111	
HID Number:	Not reported	1
Facility Registry Id:		110005726526
Lead and Program:		HEER EP&R
ER:	Not reported	k
Units:	Hilo Quality	Cleaners oil impacted soils
Substances:	diesel #6 bu	inker
Less Or Greater Than:		Not reported
Numerical Quantity:		Not reported
Units:	Not reported	Ł
Activity Type:	Response	
Activity Lead:	Terry Corpu	S
Assignment End Date:		Not reported
Result:	Refer to ISS	ST
File Under:	Hilo Quality	Cleaners
Latitude:	19.66932	
Longitude:	-155.30707	5
Island:	Howoii	
Supplemental Lea Taxt	nawali	Not reported
Supplemental Loc. Text.		Not reported
	19940111	4
Fooility Dogistry Ide	Not reported	110005706506
I acility negistry IU.		
Leau anu Program:	Not report	
ER.		A Cleaners oil impedated sells
Units:		Cleaners oil impacted solls
Substances:	ulesel #0 DL	IIIKEI

# 1004688848

Database(s)

EDR ID Number EPA ID Number

# HILO QUALITY CLEANERS (Continued)

Less Or Greater Than: Numerical Quantity: Units: Activity Type: Activity Lead: Assignment End Date: Result: File Under: Latitude: Longitude:	Not reported Response Terry Corpu Refer to ISS Hilo Quality 19.715911 -155.082942	Not reported Not reported s Not reported T Cleaners
Island:	Hawaii	
Supplemental Loc. Text:	:	Not reported
Case Number:	19950111	
HID Number:	Not reported	ł
Facility Registry Id:		110005726526
Lead and Program:		HEER EP&R
ER:	Not reported	ł
Units:	Hilo Quality	Cleaners tank removal
Substances:	Diesel #6 Bu	unker
Less Or Greater Than:		Not reported
Numerical Quantity:		Not reported
Units:	Not reported	ł
Activity Type:	Response	
Activity Lead:	Terry Corpu	S
Assignment End Date:		Not reported
Result:	Refer to ISS	Τ
File Under:	Hilo Quality	Cleaners
Latitude:	19.715911	
Longitude:	-155.082942	2
Island:	Hawaii	
Supplemental Loc. Text:		Not reported
Case Number:	19950111	
HID Number:	Not reported	ł
Facility Registry Id:		110005726526
Lead and Program:		HEER EP&R
ER:	Not reported	1
Units:	Hilo Quality	Cleaners tank removal
Substances:	Diesel #6 Bu	unker
Less Or Greater Than:		Not reported
Numerical Quantity:		Not reported
Units:	Not reported	1
Activity Type:	Response	
Activity Lead:	Terry Corpu	S
Assignment End Date:		Not reported
Hesult:	Heter to ISS	
File Under:	HIIO Quality	Cleaners
	19.00932	-
Longitude:	-155.30/0/5	)

# FINDS:

Registry ID:

110005726526

Environmental Interest/Information System

RCRAInfo is a national information system that supports the Resource

MAP FINDINGS

EDR ID Number Database(s) EPA ID Number

	HILO QUALITY CLEANERS	(Continued) Conservation and Recovery Act (RCRA) program through the tracking events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCR program staff to track the notification, permit, compliance, and corrective action activities required under RCRA. STATE MASTER this hyperlink while viewing on your computer to access program In the EDR Site Report.	of A	1004688848
	ECHO: Envid: Registry ID: DFR URL:	1004688848 110005726526 http://echo.epa.gov/detailed-facility-report?fid=110005726526		
	AIRS: Facility ID: Island: Mailing Address: Locale: Business Phone: Mailing City,St,Zip: Contact Name: Contact Title: Date Permit Issue: Date Permit Issue: Date Permit Expire: Description:	0521-01-N Hawaii 865 Kinoole Street Not reported 808-935-1620 Hilo, Hawaii 96720 Wayne Tajiri Engineer 05/31/2013 05/30/2018 One (1) 150 hp Superior Boiler Works Boiler and One (1) 200 hp York-Shipley Boiler1. Attachment of this permit encompasses the following equipment and associated appurtenances:a.150 hp Superior Boiler Works Boiler, model no. S12-0-50-RM7840L-F7T-UL-CSD-1, set no. 13537; andb.200 hp York-Shipley Boiler, series 564, serial no. 02-21314H-14833.	rial	
25 South 1/2-1 0.774 mi. 4086 ft.	HILO SODA WORKS 270 E KAWILI ST HILO, HI 96720		SHWS LUST UST	U003155315 N/A
Relative: Higher Actual: 58 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifie Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And C Island: SDAR Environmental In HID Number: Facility Registry Identifie	Not reported Not reported Hawaii Hilo Soda Works Tank Closure Not reported rr: 110013786803 HEER State Unassigned NFA Controls: No Hazard Hawaii terest Name: Hilo Soda Works Tank Closure Not reported or: 110013786803		

HILO SODA WORKS (Continued)

MAP FINDINGS

Database(s)

EDR ID Number EPA ID Number

# U003155315

Lead Agency:	HEER	
Potential Hazard And C	ontrols:	No Hazard
Priority:	NFA	
Assessment:	Response N	lecessary
Response:	Response C	Complete
Nature of Contamination	יייי יי	Not reported
Nature of Besidual Cont	 tamination	Diesel and Gasoline USTs
Lise Restrictions:	anniadon.	No Hazard Present For Unrestricted Residential Use
Engineering Control		No riazard resent for onesticled residential ose
Engineering Control.	~~.	Not reported
Description of Restrictio	ns.	Not reported
Institutional Control:		Not reported
Within Designated Area	wide Contarr	ninatioeported
Site Closure Type:		No Further Action Letter - Unrestricted Residential Use
Document Date:	09/15/1997	
Document Number:	1997-340-R	K
Document Subject:		NFA for Hilo Soda Works site
Project Manager:	Unassigned	
Contact Information:		(808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782
LUSI:		
Facility ID:	9-603256	
Facility Status:	Site Cleanu	p Completed (NFA)
Facility Status Date:		07/31/1997
Release ID:	970025	
Project Officer:	Jose Ruiz	
LIGT		
USI:		
Facility ID:	9-603256	
Owner:	HILO SODA	A WORKS
Owner Address:	145 KEOUL	A ST
Owner City,St,Zip:		Hilo, 96720 96720
Latitude:	19.705588	
Longitude:	-155.068510	6
Horizontal Reference D	atum Name:	NAD83
Horizontal Collection Me	ethod Name:	Address Matching
		5
Tank ID:	R-1	
Date Installed	01/01/1970	
Tank Status:	Permanent	ly Out of Lise
Data Clasad:	12/04/1006	
Tank Canacity	12/04/1990	
Tank Capacity:	550 Dianal	
Substance:	Diesei	
	_	
l'ank ID:	H-2	
Date Installed:	01/01/1964	
Tank Status:	Permanent	ly Out of Use
Date Closed:	12/04/1996	
Tank Capacity:	550	
Substance	Gasoline	
	-	

Database(s)

EDR ID Number EPA ID Number

26 WNW 1/2-1 0.835 mi. 4407 ft.	HATADA BAKERY (FORME 55 KUKUAU ST HILO, HI 96720	R)		SHWS INST CONTROL SPILLS	S106817321 N/A			
Relative: Higher Actual: 25 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number:	Not reported Hawaii Not reported	l Not reported Hatada Bakery, Former					
	Facility Registry Identifie Lead Agency: Program: Project Manager:	er: HEER State Mark Sutterf	110013789258 ield					
	Hazard Priority: Potential Hazards And C Island: SDAR Environmental In	Low Controls: Hawaii terest Name:	Hazard Managed With Controls Hatada Bakery, Former					
	HID Number: Facility Registry Identific Lead Agency: Potential Hazard And Co	Not reported er: HEER ontrols:	l 110013789258 Hazard Managed With Controls					
	Priority: Assessment: Response: Nature of Contaminatior	Low Response N Response O n:	Hazard Managed With Controls Necessary Ongoing Found: Soil- TPH-D, acenaphthene, fluoranthene, benzo[a]pyrene. water- sheen and petroleum odor, benzene, acenaphthene, naphthalene,					
	Nature of Residual Cont Use Restrictions: Engineering Control:	amination:	sheen and petroleum odor, benzene, acenaphthene, naphthalene, benzo[a]pyrene TPH-D, acenaphthene, floranthene, naphthalene and possibly benzo[a]pyrene in soil and possibly groundwater Controls Required to Manage Contamination Not reported					
	Institutional Control:	ns: wido Contom	Based on the site's tight working conditions, furti investigation is limited until demolition of the buil redevelopment of the property. Must resample w Government - Hawaii Dept. of Health Letter Issu	ner site ding or /hen site is redevelo ed	ped.			
	Within Designated Area Site Closure Type: Document Date: Document Number: Document Subject: Project Manager: Contact Information:	Not reported Not reported Not reported Mark Sutterf	INATION Not reported Not reported ield (808) 586-4249 2385 Waimano Home Rd, Pearl	City, HI 96782				
	INST CONTROL: Potential hazards and co Supplemental Location: Zip Suffix: Island:	ontrols: Not reported Hawaii	Hazard Managed With Controls Not reported					
	Institutional Control: HI SPILLS: Island: Supplemental Loc. Text Case Number: HID Number:	Hawaii : 19990108-1/ Not reported	Government - Hawaii Dept. of Health Letter Issu Not reported 422	ed				

Database(s)

EDR ID Number EPA ID Number

Facility Registry Id:	110013789258
Lead and Program:	HEER EP&R
ER:	Not reported
Units:	Heating Oil Tank, Hatada Bakery
Substances:	Not reported
Less Or Greater Than:	Not reported
Numerical Quantity:	Not reported
Units:	Not reported
Activity Type:	Response
Activity Lead:	Terry Corpus
Assignment End Date:	Not reported
Result:	Refer to ISST
File Under:	Hatada Bakery
Latitude:	19.719821
Longitude:	-155.084015
lalandi	Цамојі

Island: Supplemental Loc. Text Case Number: HID Number: Facility Registry Id: Lead and Program: ER: Units: Substances: Less Or Greater Than: Numerical Quantity: Units: Activity Type: Activity Lead: Assignment End Date: Result: File Under: Latitude:	Hawaii Not reported 19990108-1422 Not reported 110013789258 HEER EP&R Not reported Heating Oil Tank, Hatada Bakery Not reported Not reported Not reported Response Terry Corpus Not reported Refer to ISST Hatada Bakery 19.66932
Latitude: Longitude:	19.66932 -155.307075
20	

27	HILO MACARONI FACTORY
West	639 KINOOLE ST
1/2-1	HILO, HI 96720

West 1/2-1 0.863 mi. 4558 ft.

**Relative:** SHWS: Higher Organization: Not reported Supplemental Location: Not reported Actual: Island: 39 ft. Hawaii Environmental Interest: Hilo Macaroni Factory Not reported HID Number: Facility Registry Identifier: Not reported HEER Lead Agency: Program: State Project Manager: Mark Sutterfield Hazard Priority: NFA Potential Hazards And Controls: No Hazard Island: Hawaii SDAR Environmental Interest Name: Hilo Macaroni Factory HID Number: Not reported Facility Registry Identifier: Not reported

SHWS S106817724 SPILLS N/A

S106817321

TC5207731.2s Page 47

HILO MACARONI FACTORY (Continued)

# MAP FINDINGS

Database(s)

EDR ID Number EPA ID Number

# S106817724

Lead Agency:	HEER	
Potential Hazard And C	ontrols:	No Hazard
Priority:	NFA	
Assessment:	Response N	lecessarv
Response:	Response C	Complete
Nature of Contamination	n.	Found: Diesel
Nature of Besidual Con	 tamination	Petroleum contaminated soil
Lico Postrictions:	anniation.	No Hazard Present For Uprostricted Posidential Use
		No Hazaru Fresent for Onestricted Residential Ose
Engineering Control:		Not reported
Description of Restrictio	ns:	Not reported
Institutional Control:		Not reported
Within Designated Area	wide Contam	ni <b>Natioe</b> ported
Site Closure Type:		No Further Action Letter - Unrestricted Residential Use
Document Date:	04/22/2004	
Document Number:	2004-178-N	IS
Document Subject:		Review of Underground Storage Tank Closure Report, Former Hilo Macaroni Factory Ltd. Mar 2004
Project Manager	Mark Sutter	field
Contact Information:	Mark Outor	(808) 586-4249 2385 Waimano Home Bd. Pearl City, HI 96782
Contact micrination.		
HI SPILLS:		
Island:	Hawaii	
Supplemental Loc. Text	:	Not reported
Case Number:	20030918-1	149
HID Number:	Not reported	t de la constante de
Facility Registry Id:		Not reported
Lead and Program:		HEER EP&R
ER:	Not reported	d la
Units:	1.000 gal di	esel tank removal
Substances:	Diesel Fuel	
Less Or Greater Than:	Biocorr dor	Not reported
Numerical Quantity:		Not reported
Unito:	Linknown	Not reported
Activity Types	Deenenaa	
Activity Lood	Response	
Activity Lead:	Mike Cripps	
Assignment End Date:		Not reported
Result:	SOSC NFA	
File Under:	Hilo Macaro	ni Factory Ltd
Latitude:	19.66932	
Longitude:	-155.30707	5
Island:	Hawaii	
Supplemental Loc. Text	:	Not reported
Case Number:	20030918-1	149
HID Number:	Not reported	t
Facility Registry Id:		Not reported
Lead and Program:		HEER EP&R
ER:	Not reported	t de la constante de
Units:	1.000 gal di	esel tank removal
Substances	Diesel Fuel	
Less Or Greater Than		Not reported
Numerical Quantity:		Not reported
Inite:	Unknown	not reported
	Deensing	
Activity Type:	Response	
Activity Lead:	Mike Cripps	
Assignment End Date:		Not reported
Result:	SOSC NFA	

Map ID Direction			MAP FINDINGS			
Distance Elevation	Site			Da	itabase(s)	EDR ID Number EPA ID Number
	HILO MACARONI FACTOR	(Continue	d)			S106817724
	File Under: Latitude: Longitude:	Hilo Macaro 19.718997 -155.0849	ni Factory Ltd			
28 ENE 1/2-1 0.866 mi. 4575 ft.	WOOD PROTECTION COM 150 KEAA ST HILO, HI 96720	PANY (HPM	BUILDING SUPPLY)		SHWS SPILLS	S104657437 N/A
Relative: Higher Actual: 18 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifie Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And O Island: SDAR Environmental In HID Number: Facility Registry Identifie Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contamination Nature of Residual Com Use Restrictions: Engineering Control: Description of Restriction Institutional Control: Within Designated Area Site Closure Type: Document Date: Document Number: Document Subject: Project Manager: Contact Information: HI SPILLS: Island: Supplemental Loc. Text Case Number: HID Number: Facility Registry Id: Lead and Program: ER: Units: Substances: Less Or Greater Than:	Not reported Hawaii HID9811642 er: HEER State John Peard Low Controls: Hawaii terest Name HID9811642 er: HEER ontrols: Low Assessmen Not reported n: tamination: ons: wide Contam Not reported Not reported John Peard Hawaii	Mot reported HPM Building Supply DBA-Hawaii Wood Prote 254 110002148658 Hazard Present HPM Building Supply DBA-Hawaii Wood Prote 254 110002148658 Hazard Present t Ongoing d Presumed: Copper, chromium and arsenic in a Not reported Controls Required to Manage Contamination Not reported Not reported Not reported Not reported Not reported (808) 933-9921 Environmental Health Bldg, 15 HI 96720 Not reported Not reported Not reported Not reported Not reported Not reported S4 110002148658 HEER EP&R ng Supply (Wood Protection Co.) Copper Arsenate Not reported	ection, Inc ection, Inc soil.	hameha Av	e, Hilo,

TC5207731.2s Page 49

Database(s)

EDR ID Number EPA ID Number

	WOOD PROTECTION COM	PANY (HPM BUILDING SUPPLY) (Continued)	\$104657437
	Numerical Quantity:	4000	
		Gallons	
	Activity Lood:	Response Mike Crippe	
	Activity Lead.	Not reported	
	Assignment Life Date.	Pofor to SDAP	
	File Under:	HPM Building Supply	
	l atitude:		
	Longitude:	-155 307075	
	Longitudo.	100.007070	
	Island:	Hawaii	
	Supplemental Loc. Tex		
		19900722	
	HID Number:	HID981164254	
	Facility Registry Id:		
	Lead and Program:	HEER EP&R	
	ER.	tes	
	Substances:	Chromated Copper Arconate	
	Less Or Greater Than:	Not reported	
	Numerical Quantity:	4000	
	Unite:	Gallons	
	Activity Type:	Besponse	
	Activity Lead:	Mike Cripps	
	Assignment End Date:	Not reported	
	Result:	Befer to SDAB	
	File Under	HPM Building Supply	
	Latitude:	19.724579	
	Longitude:	-155.058813	
29 SSE	HILO MECHANICAL, INC		SHWS 1006820676
29 SSE 1/2-1	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI, 96720		SHWS 1006820676 N/A
29 SSE 1/2-1 0 881 mi	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720		SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720		SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative:	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720		SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization:	Not reported	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location:	Not reported	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island:	Not reported Not reported Hawaii	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest:	Not reported Not reported Hawaii Hilo Mechanical, Inc.	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And	Not reported Mot reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii tterest Name: Hilo Mechanical, Inc.	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii nterest Name: Hilo Mechanical, Inc. Not reported	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii nterest Name: Hilo Mechanical, Inc. Not reported er: 110013786778	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Pacility Registry Identifi Lead Agency:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii nterest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported er: 110013786778	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Potential Hazard And C Priority:	Not reported Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii nterest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported ontrols: Hazard Undetermined NEA	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Potential Hazard And C Priority: Assessment:	Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii nterest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported ontrols: Hazard Undetermined NFA	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Potential Hazard And C Priority: Assessment: Besponse:	Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii terest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported ontrols: Hazard Undetermined NFA Not reported NFA	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contaminatio	Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii terest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported iontrols: Hazard Undetermined NFA Not reported iontrols: Hazard Undetermined NFA	SHWS 1006820676 N/A
29 SSE 1/2-1 0.881 mi. 4651 ft. Relative: Higher Actual: 62 ft.	HILO MECHANICAL, INC 50 HOLOMUA ST HILO, HI 96720 SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifi Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And I Island: SDAR Environmental Ir HID Number: Facility Registry Identifi Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contaminatio	Not reported Hawaii Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported State Unassigned NFA Controls: Hazard Undetermined Hawaii Iterest Name: Hilo Mechanical, Inc. Not reported er: 110013786778 Not reported ontrols: Hazard Undetermined NFA Not reported iontrols: Hazard Undetermined NFA Assessment Ongoing Not reported n: Not reported	SHWS 1006820676 N/A

Map ID	MAP FINDINGS		
Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
	HILO MECHANICAL, INC (Continued)		1006820676
30 WNW	Nature of Residual Contamination: Not reported   Use Restrictions: Undetermined   Engineering Control: Not reported   Description of Restrictions: Not reported   Institutional Control: Not reported   Within Designated Areawide ContamiNativeported Site Closure Type:   No Further Action - Type Undetermined Document Date:   Document Date: 03/23/1995   Document Number: Not reported   Document Subject: Not reported   Project Manager: Unassigned   Contact Information: (808) 586-4249 2385 Waimano Home Rd, Pearl City	, HI 96782  EDR MGP	1008409004 N/A
WNW 1/2-1 0.892 mi. 4708 ft.	HILO, HI 96720		N/A
Relative: Lower	Manufactured Gas Plants: No additional information available		
11 ft.			
31 South 1/2-1 0.892 mi. 4712 ft.	USDA FOREST SERVICE PSW EXPERIMENTAL STATION 1643 KILAUEA AVE HILO, HI 96720	SHWS	1006819479 N/A
Relative:	SHWS:		
Higher Actual: 46 ft.	Organization: Not reported   Supplemental Location: PSW Experimental Station Kawili St & Kilauea Ave   Island: Hawaii   Environmental Interest: USDA Forest Service PSW Experimental Station   HID Number: HI0122390008   Facility Registry Identifier: 110013772845   Lead Agency: EPA		
	Program: State Project Manager: Unassigned Hazard Priority: NFA		
	Potential Hazards And Controls: No Hazard Island: Hawaii SDAR Environmental Interest Name: USDA Forest Service PSW Experimental Station HID Number: HI0122390008		
	Facility Registry Identifier: 110013772845 Lead Agency: EPA Potential Hazard And Controls: No Hazard		
	Priority: NFA Assessment: Response Necessary		
	Response: Response Complete		
	Nature of Contamination: Not reported		
	Use Restrictions: No Hazard Present For Unrestricted Residential Use		
	Engineering Control: Not reported Description of Restrictions: Not reported		

Map ID Direction			MAP FINDINGS		
Distance Elevation	Site			Database(s)	EDR ID Number EPA ID Number
	USDA FOREST SERVICE P	SW EXPERIN	MENTAL STATION (Continued)		1006819479
	Institutional Control: Within Designated Area Site Closure Type: Document Date: Document Number: Document Subject: Project Manager: Contact Information:	wide Contarr 03/08/1986 Not reported Unassigned	Not reported i <b>Native</b> ported No Further Action Letter - Unrestricted Resid d PA, Review, USDA Forest Service PSE Expe (808) 586-4249 2385 Waimano Home Rd, Pe	lential Use erimental Station earl City, HI 96782	
32 SSE 1/2-1 0.926 mi. 4887 ft.	HAWAII PEST CONTROL 56 WIWOOLE ST HILO, HI 96720			SHWS	1006820888 N/A
Relative: Higher	SHWS: Organization:	Not reported	1		
Actual:	Supplemental Location:		Unit A		
53 ft.	Island:	Hawaii			
	Environmental Interest:		Hawaii Pest Control		
	HID Number: Eacility Registry Identify	HIUUUU0032 ar	200 110013789132		
	Lead Agency:	HEER	110010700102		
	Program:	State			
	Project Manager:	John Peard			
	Hazard Priority:	Medium			
	Potential Hazards And (	Controls:	Hazard Present		
	Island:	Hawaii	Lie all Deel Oralist		
	SDAR Environmental in HID Number:	HIDDODED32	Hawaii Pest Control		
	Facility Registry Identifie	er:	110013789132		
	Lead Agency:	HEER			
	Potential Hazard And C	ontrols:	Hazard Present		
	Priority:	Medium			
	Assessment:	Response N	lecessary		
	Nature of Contamination	nesponse c n	Found: Organochlorine pesticides		
	Nature of Residual Con	tamination:	Not reported		
	Use Restrictions:		Controls Required to Manage Contamination	l	
	Engineering Control:		Not reported		
	Description of Restrictio	ns:	Not reported		
	Institutional Control: Within Designated Area	wide Contam	Not reported		
	Site Closure Type:		Not reported		
	Document Date:	Not reported	3		
	Document Number:	Not reported	t		
	Document Subject:		Not reported		
	Project Manager: Contact Information:	John Peard	(808) 933-9921 Environmental Health Bldg, T HI 96720	1582 Kamehameha Av	e, Hilo,

Database(s)

EDR ID Number EPA ID Number

33 SSE 1/2-1 0.937 mi. 4946 ft.	KANOELEHUA INDUSTRIAL 20 POOKELA ST HILO, HI 96720	WAREHOU	ISE	SHWS BROWNFIELDS	S110061615 N/A
Relative: Higher Actual: 66 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest: HID Number: Facility Registry Identifie Lead Agency: Program: Project Manager: Hazard Priority: Potential Hazards And C Island: SDAR Environmental In HID Number: Facility Registry Identifie Lead Agency: Potential Hazard And C Priority: Assessment: Response: Nature of Contamination Nature of Residual Cont Use Restrictions: Engineering Control: Description of Restrictio Institutional Control: Within Designated Area Site Closure Type: Document Date: Document Subject: Project Manager: Contact Information:	Not reported Hawaii Not reported er: HEER Brownfields Unassigned Low Controls: Hawaii terest Name: Not reported amination: ns: wide Contam Not reported Not reported Not reported Unassigned	Kanoelehua Industrial Warehouse Kanoelehua Industrial Warehouse Not reported Hazard Undetermined Kanoelehua Industrial Warehouse Not reported Hazard Undetermined Congoing Not reported Not reported	I City, HI 96782	
	BROWNFIELDS: Program: Supplemental Location: Island: Zip Suffix:	Brownfields Hawaii Not reported	Kanoelehua Industrial Warehouse		
34 WNW 1/2-1 0.954 mi. 5037 ft.	HILO ARSENIC 33B LILIUOKALANI LN HILO, HI 96720			SHWS ENG CONTROLS INST CONTROL SPILLS	S108008859 N/A
Relative: Higher Actual: 13 ft.	SHWS: Organization: Supplemental Location: Island: Environmental Interest:	Not reportec Hawaii	l Not reported Hilo Arsenic Spill Site		

HI0001290816

HID Number:

Database(s)

EDR ID Number EPA ID Number

### S108008859

**HILO ARSENIC (Continued)** Facility Registry Identifier: 110009278824 Lead Agency: EPA Program: Preliminary Assessment/Site Inspection Project Manager: Laura Young Hazard Priority: NFA Potential Hazards And Controls: Hazard Managed With Controls Island: Hawaii SDAR Environmental Interest Name: Hilo Arsenic Spill Site HI0001290816 HID Number: Facility Registry Identifier: 110009278824 Lead Agency: EPA Potential Hazard And Controls: Hazard Managed With Controls Priority: NFA Assessment: Response Necessary Response: **Response Complete** Nature of Contamination: Found: Arsenic in soil. Contaminated soil bound in concrete slab on site Nature of Residual Contamination: Arsenic in soil. First 12-18 inches bound in concrete. Use Restrictions: Controls Required to Manage Contamination **Engineering Control: Engineering Control Required** Description of Restrictions: Prohibit Any Activity That May Disturb the Integrity of the Capping System Institutional Control: Government - Hawaii Dept. of Health Letter Issued Within Designated Areawide ContamiNaticeported Site Closure Type: Historic NFA - Restricted Use Document Date: 09/04/1997 Document Number: 1997-326-LY Document Subject: NFA letter for Hilo Arsenic Site Project Manager: Laura Young (808) 586-4249 2385 Waimano Home Rd, Pearl City, HI 96782 Contact Information: ENG CONTROLS: Supplemental Location Text: Not reported Zip Suffix: Not reported Island. Hawaii Potential Hazards And Controls: Hazard Managed With Controls **Engineering Control:** Engineering Control Required INST CONTROL: Potential hazards and controls: Hazard Managed With Controls Supplemental Location: Not reported Zip Suffix: Not reported Island: Hawaii Institutional Control: Government - Hawaii Dept. of Health Letter Issued HI SPILLS: Island: Hawaii Supplemental Loc. Text: Not reported 19950509 Case Number: HID Number: HI0001290816 Facility Registry Id: 110009278824 Lead and Program: HEER EP&R Yes ER: Units: Hilo Arsenic Substances: Sodium Arsenate, lead and cadmium Less Or Greater Than: Not reported

Database(s)

EDR ID Number EPA ID Number

S108008859

# HILO ARSENIC (Continued)

Numerical Quantity: Units: Activity Type: Activity Lead: Assignment End Date: Result: File Under:	Gallons Response Mike Cripps Refer to ISS Hilo Arsenic	30 Not reported T
Latitude: Longitude:	19.66932 -155.307075	5
Island: Supplemental Loc. Text:	Hawaii	Not reported
Case Number: HID Number: Facility Registry Id: Lead and Program:	19950509 HI00012908	16 110009278824 HEER EP&R
ER:	Yes	
Units:	Hilo Arsenic	
Substances:	Sodium Arse	Not reported
Numerical Quantity:		30
Units:	Gallons	
Activity Type:	Response	
Activity Lead:	Mike Cripps	
Assignment End Date:		Not reported
Result:	Refer to ISS	т
File Under:	Hilo Arsenic	
Latitude:	19.7204	
Longitude:	-155.08506	
Island:	Hawaii	
Supplemental Loc. Text:		Not reported
Case Number:	19950509	
HID Number:	HI00012908	
Facility Registry Id:		110009278824
Lead and Program:	Vaa	HEER EP&R
En. Unito:	Tes Lilo Aroonio	
Culits.	Sodium Aro	anota load and addmium
Jubsiances.	Soulum Arse	Not reported
Numerical Quantity:		30
l Inite	Gallons	80
Activity Type	Response	
Activity Lead:	Mike Cripps	
Assignment End Date:	mille enppe	Not reported
Result:	Refer to ISS	Т
File Under:	Hilo Arsenic	
Latitude:	19.719482	
Longitude:	-155.084692	2

### Count: 10 records.

#### ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HILO	S108008478	ARMY AVIATION SUPPORT FACILITY #2	HILO INTERNATIONAL AIRPORT BUI	96720	SHWS
HILO	S108859939	PACIFIC AQUACULTURE AND COASTAL RE	KALANIANAOLE ST	96720	SHWS, BROWNFIELDS
HILO	S118943674	HAWAII COUNTY KAMEHAMEHA AVENUE IM	KAMEHAMEHA AVE	96720	SHWS
HILO	1011487908	KILAUEA VOLCANO AIR MONITORING	KILAUEA VOLCANO		SEMS
HILO	S107022566	HILO JUDICIARY CENTER PROJECT	KILAUEA AVE	96720	SHWS, ENG CONTROLS, INST CONT
HILO	S118943725	WAIAKEA MILL COMPANY - CAMP 1	KOHOLA, UHU, MANINI, KOLE STRE	96720	SHWS
HILO	S110061564	HILO SAFEWAY/TARGET	MAKAALA ST X RAILROAD AVE	96720	SHWS, ENG CONTROLS, INST CONT
HILO	S115554812	ARSENIC MILILANI STREET IN HILO	MILILANI ST	96720	SHWS, INST CONTROL, SPILLS
HILO	1003879704	HILO BAY FRONT SOCCER FIELD	OFF KAMEHAMEHA AVE. BET PAUAHI	96720	SEMS-ARCHIVE
HILO	S118943731	WAILOA RIVER STATE RECREATION AREA	PIILANI ST, KAMEHAMEHA AVE, BI	96720	SHWS

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

# STANDARD ENVIRONMENTAL RECORDS

# Federal NPL site list

#### NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/05/2018 Number of Days to Update: 14 Source: EPA Telephone: N/A Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 04/16/2018 Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC) Telephone: 202-564-7333

EPA Region 1 Telephone 617-918-1143

EPA Region 3 Telephone 215-814-5418

EPA Region 4 Telephone 404-562-8033

EPA Region 5 Telephone 312-886-6686

EPA Region 10 Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

EPA Region 6

EPA Region 7

EPA Region 8

**EPA Region 9** 

Telephone: 214-655-6659

Telephone: 913-551-7247

Telephone: 303-312-6774

Telephone: 415-947-4246

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/05/2018 Number of Days to Update: 14

Source: EPA Telephone: N/A Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Quarterly

### NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991 Date Data Arrived at EDR: 02/02/1994 Date Made Active in Reports: 03/30/1994 Number of Days to Update: 56 Source: EPA Telephone: 202-564-4267 Last EDR Contact: 08/15/2011 Next Scheduled EDR Contact: 11/28/2011 Data Release Frequency: No Update Planned

### Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/05/2018 Number of Days to Update: 14 Source: EPA Telephone: N/A Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 04/16/2018 Data Release Frequency: Quarterly

# Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016	Source: Environmental Protection Agency
Date Data Arrived at EDR: 01/05/2017	Telephone: 703-603-8704
Date Made Active in Reports: 04/07/2017	Last EDR Contact: 01/05/2018
Number of Days to Update: 92	Next Scheduled EDR Contact: 04/16/2018
	Data Release Frequency: Varies

# SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 21 Source: EPA Telephone: 800-424-9346 Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 04/30/2018 Data Release Frequency: Quarterly

#### Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 21 Source: EPA Telephone: 800-424-9346 Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 04/30/2018 Data Release Frequency: Quarterly

# Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/11/2017	Source: EPA
Date Data Arrived at EDR: 12/26/2017	Telephone: 800-424-9346
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 01/19/2018
Number of Days to Update: 45	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

# Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 45 Source: Environmental Protection Agency Telephone: (415) 495-8895 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

#### Federal RCRA generators list

#### RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 45 Source: Environmental Protection Agency Telephone: (415) 495-8895 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

#### RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 45 Source: Environmental Protection Agency Telephone: (415) 495-8895 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

# RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 45 Source: Environmental Protection Agency Telephone: (415) 495-8895 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

### Federal institutional controls / engineering controls registries

#### LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/22/2017	Source: Department of the Navy
Date Data Arrived at EDR: 06/13/2017	Telephone: 843-820-7326
Date Made Active in Reports: 09/15/2017	Last EDR Contact: 02/09/2018
Number of Days to Update: 94	Next Scheduled EDR Contact: 05/28/2018
	Data Release Frequency: Varies

# US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 11/13/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/27/2017	Telephone: 703-603-0695
Date Made Active in Reports: 02/09/2018	Last EDR Contact: 02/27/2018
Number of Days to Update: 74	Next Scheduled EDR Contact: 06/11/2018
	Data Release Frequency: Varies

# US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 11/13/2017 Date Data Arrived at EDR: 11/27/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 74 Source: Environmental Protection Agency Telephone: 703-603-0695 Last EDR Contact: 02/27/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Varies

### Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/18/2017 Date Data Arrived at EDR: 09/21/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 22 Source: National Response Center, United States Coast Guard Telephone: 202-267-2180 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

### State- and tribal - equivalent CERCLIS

SHWS: Sites List

Facilities, sites or areas in which the Office of Hazard Evaluation and Emergency Response has an interest, has investigated or may investigate under HRS 128D (includes CERCLIS sites).

Date of Government Version: 01/23/2018	Source: Department of Health
Date Data Arrived at EDR: 02/21/2018	Telephone: 808-586-4249
Date Made Active in Reports: 02/26/2018	Last EDR Contact: 02/21/2018
Number of Days to Update: 5	Next Scheduled EDR Contact: 06/04/2018
	Data Release Frequency: Semi-Annually

### State and tribal landfill and/or solid waste disposal site lists

#### SWF/LF: Permitted Landfills in the State of Hawaii

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/17/2012 Date Data Arrived at EDR: 04/03/2013 Date Made Active in Reports: 05/10/2013 Number of Days to Update: 37 Source: Department of Health Telephone: 808-586-4245 Last EDR Contact: 12/28/2017 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Varies

### State and tribal leaking storage tank lists

#### LUST: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 08/01/2017 Date Data Arrived at EDR: 08/30/2017 Date Made Active in Reports: 09/15/2017 Number of Days to Update: 16 Source: Department of Health Telephone: 808-586-4228 Last EDR Contact: 03/02/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/25/2017	Source: EPA Region 10
Date Data Arrived at EDR: 11/07/2017	Telephone: 206-553-2857
Date Made Active in Reports: 12/08/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 31	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Ta LUSTs on Indian land in Colorado, Montana, N	anks on Indian Land Iorth Dakota, South Dakota, Utah and Wyoming.	
Date of Government Version: 05/01/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: EPA Region 8 Telephone: 303-312-6271 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN LUST R7: Leaking Underground Storage Ta LUSTs on Indian land in Iowa, Kansas, and Ne	anks on Indian Land braska	
Date of Government Version: 04/14/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/06/2017 Number of Days to Update: 71	Source: EPA Region 7 Telephone: 913-551-7003 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN LUST R6: Leaking Underground Storage Ta LUSTs on Indian land in New Mexico and Okla	anks on Indian Land Ihoma.	
Date of Government Version: 04/24/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/06/2017 Number of Days to Update: 71	Source: EPA Region 6 Telephone: 214-665-6597 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land LUSTs on Indian land in Florida, Mississippi and North Carolina.		
Date of Government Version: 10/14/2016 Date Data Arrived at EDR: 01/27/2017 Date Made Active in Reports: 05/05/2017 Number of Days to Update: 98	Source: EPA Region 4 Telephone: 404-562-8677 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Semi-Annually	
INDIAN LUST R1: Leaking Underground Storage Ta A listing of leaking underground storage tank lo	anks on Indian Land ocations on Indian Land.	
Date of Government Version: 04/14/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/06/2017 Number of Days to Update: 71	Source: EPA Region 1 Telephone: 617-918-1313 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN LUST R5: Leaking Underground Storage Ta Leaking underground storage tanks located on	anks on Indian Land Indian Land in Michigan, Minnesota and Wisconsin.	
Date of Government Version: 04/26/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: EPA, Region 5 Telephone: 312-886-7439 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN LUST R9: Leaking Underground Storage Ta LUSTs on Indian land in Arizona, California, Ne	anks on Indian Land ew Mexico and Nevada	
Date of Government Version: 04/13/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: Environmental Protection Agency Telephone: 415-972-3372 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	

# State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing A listing of all FEMA owned underground stora	ge tanks.	
Date of Government Version: 05/15/2017 Date Data Arrived at EDR: 05/30/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 136	Source: FEMA Telephone: 202-646-5797 Last EDR Contact: 01/09/2018 Next Scheduled EDR Contact: 04/23/2018 Data Release Frequency: Varies	
IST: Underground Storage Tank Database Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recove Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.		
Date of Government Version: 08/01/2017 Date Data Arrived at EDR: 08/30/2017 Date Made Active in Reports: 09/15/2017 Number of Days to Update: 16	Source: Department of Health Telephone: 808-586-4228 Last EDR Contact: 03/02/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Semi-Annually	
INDIAN UST R5: Underground Storage Tanks on In The Indian Underground Storage Tank (UST) of Iand in EPA Region 5 (Michigan, Minnesota an	dian Land database provides information about underground storage tanks on Indian d Wisconsin and Tribal Nations).	
Date of Government Version: 04/26/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/06/2017 Number of Days to Update: 71	Source: EPA Region 5 Telephone: 312-886-6136 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN UST R6: Underground Storage Tanks on Indian Land The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian Iand in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).		
Date of Government Version: 04/24/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 12/08/2017 Number of Days to Update: 134	Source: EPA Region 6 Telephone: 214-665-7591 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN UST R9: Underground Storage Tanks on In The Indian Underground Storage Tank (UST) of Iand in EPA Region 9 (Arizona, California, Haw	dian Land Jatabase provides information about underground storage tanks on Indian /aii, Nevada, the Pacific Islands, and Tribal Nations).	
Date of Government Version: 04/13/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: EPA Region 9 Telephone: 415-972-3368 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies	
INDIAN UST R10: Underground Storage Tanks on I The Indian Underground Storage Tank (UST) of land in EPA Region 10 (Alaska, Idaho, Oregon	Indian Land Jatabase provides information about underground storage tanks on Indian , Washington, and Tribal Nations).	
Date of Government Version: 04/25/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: EPA Region 10 Telephone: 206-553-2857 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018	

Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks or The Indian Underground Storage Tank (US Iand in EPA Region 8 (Colorado, Montana,	n Indian Land T) database provides information about underground storage tanks on Indian North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).
Date of Government Version: 05/01/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 78	Source: EPA Region 8 Telephone: 303-312-6137 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies
INDIAN UST R4: Underground Storage Tanks of The Indian Underground Storage Tank (US land in EPA Region 4 (Alabama, Florida, Go and Tribal Nations)	n Indian Land T) database provides information about underground storage tanks on Indian eorgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
Date of Government Version: 10/14/2016	Source: EPA Region 4

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/19/2018
Next Scheduled EDR Contact: 05/07/2018
Data Release Frequency: Semi-Annually

### INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/14/2017 Date Data Arrived at EDR: 07/27/2017 Date Made Active in Reports: 10/06/2017 Number of Days to Update: 71 Source: EPA, Region 1 Telephone: 617-918-1313 Last EDR Contact: 01/23/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies

# INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 05/02/2017	Source: EPA Region 7
Date Data Arrived at EDR: 07/27/2017	Telephone: 913-551-7003
Date Made Active in Reports: 10/06/2017	Last EDR Contact: 01/23/2018
Number of Days to Update: 71	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

# State and tribal institutional control / engineering control registries

ENG CONTROLS: Engineering Control Sites

A listing of sites with engineering controls in place.

Date of Government Version: 01/23/2018	Source: Department of Health
Date Data Arrived at EDR: 02/21/2018	Telephone: 404-586-4249
Date Made Active in Reports: 02/26/2018	Last EDR Contact: 02/21/2018
Number of Days to Update: 5	Next Scheduled EDR Contact: 06/04/2018
	Data Release Frequency: Varies

# INST CONTROL: Sites with Institutional Controls

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

Date of Government Version: 01/23/2018	Source: Department of Health
Date Data Arrived at EDR: 02/21/2018	Telephone: 808-586-4249
Date Made Active in Reports: 02/26/2018	Last EDR Contact: 02/21/2018
Number of Days to Update: 5	Next Scheduled EDR Contact: 06/04/2018
	Data Release Frequency: Varies

### State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisite A listing of voluntary cleanup priority sites lo	ng cated on Indian Land located in Region 7.
Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015	Source: EPA, Region 1
Date Data Arrived at EDR: 09/29/2015	Telephone: 617-918-1102
Date Made Active in Reports: 02/18/2016	Last EDR Contact: 12/20/2017
Number of Days to Update: 142	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Varies

VCP: Voluntary Response Program Sites

Sites participating in the Voluntary Response Program. The purpose of the VRP is to streamline the cleanup process in a way that will encourage prospective developers, lenders, and purchasers to voluntarily cleanup properties.

Date of Government Version: 01/23/2018 Date Data Arrived at EDR: 02/21/2018 Date Made Active in Reports: 02/26/2018 Number of Days to Update: 5 Source: Department of Health Telephone: 808-586-4249 Last EDR Contact: 02/21/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Varies

#### State and tribal Brownfields sites

**BROWNFIELDS:** Brownfields Sites

With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

Date of Government Version: 01/23/2018 Date Data Arrived at EDR: 02/21/2018 Date Made Active in Reports: 02/26/2018 Number of Days to Update: 5 Source: Department of Health Telephone: 808-586-4249 Last EDR Contact: 02/21/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Varies

# ADDITIONAL ENVIRONMENTAL RECORDS

#### Local Brownfield lists

## US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 01/19/2018 Date Data Arrived at EDR: 01/19/2018 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 21 Source: Environmental Protection Agency Telephone: 202-566-2777 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/02/2018 Data Release Frequency: Semi-Annually

# Local Lists of Landfill / Solid Waste Disposal Sites

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands Location of open dumps on Indian land.

	Date of Government Version: 12/31/1998 Date Data Arrived at EDR: 12/03/2007 Date Made Active in Reports: 01/24/2008 Number of Days to Update: 52	Source: Environmental Protection Agency Telephone: 703-308-8245 Last EDR Contact: 01/30/2018 Next Scheduled EDR Contact: 05/14/2018 Data Release Frequency: Varies
DEB	RIS REGION 9: Torres Martinez Reservation III A listing of illegal dump sites location on the To County and northern Imperial County, Californi	legal Dump Site Locations rres Martinez Indian Reservation located in eastern Riverside a.
	Date of Government Version: 01/12/2009 Date Data Arrived at EDR: 05/07/2009 Date Made Active in Reports: 09/21/2009 Number of Days to Update: 137	Source: EPA, Region 9 Telephone: 415-947-4219 Last EDR Contact: 01/22/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: No Update Planned
ODI:	Open Dump Inventory An open dump is defined as a disposal facility t Subtitle D Criteria.	that does not comply with one or more of the Part 257 or Part 258
	Date of Government Version: 06/30/1985 Date Data Arrived at EDR: 08/09/2004 Date Made Active in Reports: 09/17/2004 Number of Days to Update: 39	Source: Environmental Protection Agency Telephone: 800-424-9346 Last EDR Contact: 06/09/2004 Next Scheduled EDR Contact: N/A Data Release Frequency: No Update Planned
IHS	OPEN DUMPS: Open Dumps on Indian Land A listing of all open dumps located on Indian La	and in the United States.
	Date of Government Version: 04/01/2014 Date Data Arrived at EDR: 08/06/2014 Date Made Active in Reports: 01/29/2015 Number of Days to Update: 176	Source: Department of Health & Human Serivces, Indian Health Service Telephone: 301-443-1452 Last EDR Contact: 02/02/2018 Next Scheduled EDR Contact: 05/14/2018 Data Release Frequency: Varies
Loca	al Lists of Hazardous waste / Contaminated S	Sites
US F	HST CDL: National Clandestine Laboratory Reg A listing of clandestine drug lab locations that h Register.	gister have been removed from the DEAs National Clandestine Laboratory
	Date of Government Version: 01/19/2018	Source: Drug Enforcement Administration

ource: Drug Enforcement Administration
elephone: 202-307-1000
ast EDR Contact: 02/27/2018
lext Scheduled EDR Contact: 06/11/2018
ata Release Frequency: No Update Planned

# CDL: Clandestine Drug Lab Listing

A listing of clandestine drug lab site locations.

Date of Government Version: 08/04/2010 Date Data Arrived at EDR: 09/10/2010 Date Made Active in Reports: 10/22/2010 Number of Days to Update: 42 Source: Department of Health Telephone: 808-586-4249 Last EDR Contact: 02/22/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Varies

#### US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 01/09/2018 Date Data Arrived at EDR: 01/24/2018 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 16

Source: Drug Enforcement Administration Telephone: 202-307-1000 Last EDR Contact: 02/27/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Quarterly

# Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 21

Source: Environmental Protection Agency Telephone: 202-564-6023 Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Semi-Annually

# **Records of Emergency Release Reports**

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/21/2017	Source: U.S. Department of Transportation
Date Data Arrived at EDR: 09/21/2017	Telephone: 202-366-4555
Date Made Active in Reports: 10/13/2017	Last EDR Contact: 01/19/2018
Number of Days to Update: 22	Next Scheduled EDR Contact: 04/09/2018
	Data Release Frequency: Quarterly

SPILLS: Release Notifications

Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.

Date of Government Version: 02/16/2018 Date Data Arrived at EDR: 02/21/2018 Date Made Active in Reports: 02/27/2018 Number of Days to Update: 6

Source: Department of Health Telephone: 808-586-4249 Last EDR Contact: 02/21/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Varies

# SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 03/10/2012 Date Data Arrived at EDR: 01/03/2013 Date Made Active in Reports: 02/11/2013 Number of Days to Update: 39

Source: FirstSearch Telephone: N/A Last EDR Contact: 01/03/2013 Next Scheduled EDR Contact: N/A Data Release Frequency: No Update Planned

Other Ascertainable Records

#### RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 02/09/2018 Number of Days to Update: 45 Source: Environmental Protection Agency Telephone: (415) 495-8895 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

#### FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015 Date Data Arrived at EDR: 07/08/2015 Date Made Active in Reports: 10/13/2015 Number of Days to Update: 97 Source: U.S. Army Corps of Engineers Telephone: 202-528-4285 Last EDR Contact: 02/21/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Varies

# DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005 Date Data Arrived at EDR: 11/10/2006 Date Made Active in Reports: 01/11/2007 Number of Days to Update: 62 Source: USGS Telephone: 888-275-8747 Last EDR Contact: 10/13/2017 Next Scheduled EDR Contact: 01/22/2018 Data Release Frequency: Semi-Annually

#### FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005 Date Data Arrived at EDR: 02/06/2006 Date Made Active in Reports: 01/11/2007 Number of Days to Update: 339 Source: U.S. Geological Survey Telephone: 888-275-8747 Last EDR Contact: 10/11/2017 Next Scheduled EDR Contact: 01/22/2018 Data Release Frequency: N/A

#### SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017 Date Data Arrived at EDR: 02/03/2017 Date Made Active in Reports: 04/07/2017 Number of Days to Update: 63 Source: Environmental Protection Agency Telephone: 615-532-8599 Last EDR Contact: 02/16/2018 Next Scheduled EDR Contact: 05/28/2018 Data Release Frequency: Varies

# US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 01/11/2018 Date Data Arrived at EDR: 01/19/2018 Date Made Active in Reports: 03/02/2018 Number of Days to Update: 42 Source: Environmental Protection Agency Telephone: 202-566-1917 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 04/09/2018 Data Release Frequency: Quarterly

# EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013 Date Data Arrived at EDR: 03/21/2014 Date Made Active in Reports: 06/17/2014 Number of Days to Update: 88 Source: Environmental Protection Agency Telephone: 617-520-3000 Last EDR Contact: 01/31/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Quarterly

# 2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013 Date Data Arrived at EDR: 03/03/2015 Date Made Active in Reports: 03/09/2015 Number of Days to Update: 6 Source: Environmental Protection Agency Telephone: 703-308-4044 Last EDR Contact: 02/08/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016 Date Data Arrived at EDR: 06/21/2017 Date Made Active in Reports: 01/05/2018 Number of Days to Update: 198 Source: EPA Telephone: 202-260-5521 Last EDR Contact: 12/22/2017 Next Scheduled EDR Contact: 04/02/2018 Data Release Frequency: Every 4 Years

# TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016	Source: EPA
Date Data Arrived at EDR: 01/10/2018	Telephone: 202-566-0250
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 02/23/2018
Number of Days to Update: 2	Next Scheduled EDR Contact: 06/04/2018
	Data Release Frequency: Annually

# SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009 Date Data Arrived at EDR: 12/10/2010 Date Made Active in Reports: 02/25/2011 Number of Days to Update: 77 Source: EPA Telephone: 202-564-4203 Last EDR Contact: 01/25/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 12/11/2017 Date Data Arrived at EDR: 12/22/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 21 Source: EPA Telephone: 703-416-0223 Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 03/19/2018 Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017 Date Data Arrived at EDR: 11/17/2017 Date Made Active in Reports: 12/08/2017 Number of Days to Update: 21 Source: Environmental Protection Agency Telephone: 202-564-8600 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 05/07/2018 Data Release Frequency: Varies

# RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995 Date Data Arrived at EDR: 07/03/1995 Date Made Active in Reports: 08/07/1995 Number of Days to Update: 35 Source: EPA Telephone: 202-564-4104 Last EDR Contact: 06/02/2008 Next Scheduled EDR Contact: 09/01/2008 Data Release Frequency: No Update Planned

# PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013	Source: EPA
Date Data Arrived at EDR: 10/17/2014	Telephone: 202-564-6023
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 02/06/2018
Number of Days to Update: 3	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

# PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017 Date Data Arrived at EDR: 06/09/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 126 Source: EPA Telephone: 202-566-0500 Last EDR Contact: 01/12/2018 Next Scheduled EDR Contact: 04/23/2018 Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016 Date Data Arrived at EDR: 11/23/2016 Date Made Active in Reports: 02/10/2017 Number of Days to Update: 79 Source: Environmental Protection Agency Telephone: 202-564-2501 Last EDR Contact: 01/09/2018 Next Scheduled EDR Contact: 04/23/2018 Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009 Date Data Arrived at EDR: 04/16/2009 Date Made Active in Reports: 05/11/2009 Number of Days to Update: 25 Source: EPA Telephone: 202-566-1667 Last EDR Contact: 08/18/2017 Next Scheduled EDR Contact: 12/04/2017 Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 09/08/2016	Telephone: 301-415-7169
Date Made Active in Reports: 10/21/2016	Last EDR Contact: 01/19/2018
Number of Days to Update: 43	Next Scheduled EDR Contact: 05/21/2018
	Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005	Source: Department of Energy
Date Data Arrived at EDR: 08/07/2009	Telephone: 202-586-8719
Date Made Active in Reports: 10/22/2009	Last EDR Contact: 12/05/2017
Number of Days to Update: 76	Next Scheduled EDR Contact: 03/19/2018
	Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014 Date Data Arrived at EDR: 09/10/2014 Date Made Active in Reports: 10/20/2014 Number of Days to Update: 40 Source: Environmental Protection Agency Telephone: N/A Last EDR Contact: 12/08/2017 Next Scheduled EDR Contact: 03/19/2018 Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/30/2017	Telephone: 202-566-0517
Date Made Active in Reports: 12/15/2017	Last EDR Contact: 01/26/2018
Number of Days to Update: 15	Next Scheduled EDR Contact: 05/07/2018
	Data Release Frequency: Varies

#### RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/02/2017 Date Data Arrived at EDR: 10/05/2017 Date Made Active in Reports: 10/13/2017 Number of Days to Update: 8 Source: Environmental Protection Agency Telephone: 202-343-9775 Last EDR Contact: 01/04/2018 Next Scheduled EDR Contact: 04/16/2018 Data Release Frequency: Quarterly

### HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006Source: Environmental Protection AgencyDate Data Arrived at EDR: 03/01/2007Telephone: 202-564-2501Date Made Active in Reports: 04/10/2007Last EDR Contact: 12/17/2007Number of Days to Update: 40Next Scheduled EDR Contact: 03/17/2008Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned
DOT OPS: Incident and Accident Data	
Department of Transporation, Office of Pipe	line Safety Incident and Accident data.

Date of Government Version: 07/31/2012	Source: Department of Transporation, Office of Pipeline Safety
Date Data Arrived at EDR: 08/07/2012	Telephone: 202-366-4595
Date Made Active in Reports: 09/18/2012	Last EDR Contact: 01/19/2018
Number of Days to Update: 42	Next Scheduled EDR Contact: 05/14/2018
	Data Release Frequency: Varies

# CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

	Date of Government Version: 09/30/2017 Date Data Arrived at EDR: 11/10/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 63	Source: Department of Justice, Consent Decree Library Telephone: Varies Last EDR Contact: 01/04/2018 Next Scheduled EDR Contact: 04/02/2018 Data Release Frequency: Varies
BRS	Biennial Reporting System The Biennial Reporting System is a national sy and management of hazardous waste. BRS ca and Treatment, Storage, and Disposal Facilitie:	stem administered by the EPA that collects data on the generation purces detailed data from two groups: Large Quantity Generators (LQG) s.
	Date of Government Version: 12/31/2015 Date Data Arrived at EDR: 02/22/2017 Date Made Active in Reports: 09/28/2017 Number of Days to Update: 218	Source: EPA/NTIS Telephone: 800-424-9346 Last EDR Contact: 02/23/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Biennially
IND	AN RESERV: Indian Reservations This map layer portrays Indian administered lan than 640 acres.	nds of the United States that have any area equal to or greater
	Date of Government Version: 12/31/2014 Date Data Arrived at EDR: 07/14/2015 Date Made Active in Reports: 01/10/2017 Number of Days to Update: 546	Source: USGS Telephone: 202-208-3710 Last EDR Contact: 01/09/2018 Next Scheduled EDR Contact: 04/23/2018 Data Release Frequency: Semi-Annually
FUS	RAP: Formerly Utilized Sites Remedial Action F DOE established the Formerly Utilized Sites Re radioactive contamination remained from Manh	Program emedial Action Program (FUSRAP) in 1974 to remediate sites where nattan Project and early U.S. Atomic Energy Commission (AEC) operations.
	Date of Government Version: 12/23/2016 Date Data Arrived at EDR: 12/27/2016 Date Made Active in Reports: 02/17/2017 Number of Days to Update: 52	Source: Department of Energy Telephone: 202-586-3559 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Varies
UMT	FRA: Uranium Mill Tailings Sites Uranium ore was mined by private companies i shut down, large piles of the sand-like material the ore. Levels of human exposure to radioact were used as construction materials before the	for federal government use in national defense programs. When the mills (mill tailings) remain after uranium has been extracted from ive materials from the piles are low; however, in some cases tailings potential health hazards of the tailings were recognized.
	Date of Government Version: 06/23/2017 Date Data Arrived at EDR: 10/11/2017 Date Made Active in Reports: 11/03/2017 Number of Days to Update: 23	Source: Department of Energy Telephone: 505-845-0011 Last EDR Contact: 02/23/2018 Next Scheduled EDR Contact: 06/04/2018

# LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 01/09/2018 Date Data Arrived at EDR: 02/06/2018 Date Made Active in Reports: 03/02/2018 Number of Days to Update: 24 Source: Environmental Protection Agency Telephone: 703-603-8787 Last EDR Contact: 02/06/2018 Next Scheduled EDR Contact: 05/21/2018 Data Release Frequency: Varies

Data Release Frequency: Varies

# LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

	Date of Government Version: 04/05/2001 Date Data Arrived at EDR: 10/27/2010 Date Made Active in Reports: 12/02/2010 Number of Days to Update: 36	Source: American Journal of Public Health Telephone: 703-305-6451 Last EDR Contact: 12/02/2009 Next Scheduled EDR Contact: N/A Data Release Frequency: No Update Planned	
US A	US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS) The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.		
	Date of Government Version: 10/12/2016 Date Data Arrived at EDR: 10/26/2016 Date Made Active in Reports: 02/03/2017 Number of Days to Update: 100	Source: EPA Telephone: 202-564-2496 Last EDR Contact: 09/26/2017 Next Scheduled EDR Contact: 01/08/2018 Data Release Frequency: Annually	
US A	IRS MINOR: Air Facility System Data A listing of minor source facilities.		
	Date of Government Version: 10/12/2016 Date Data Arrived at EDR: 10/26/2016 Date Made Active in Reports: 02/03/2017 Number of Days to Update: 100	Source: EPA Telephone: 202-564-2496 Last EDR Contact: 09/26/2017 Next Scheduled EDR Contact: 01/08/2018 Data Release Frequency: Annually	
US N	IINES: Mines Master Index File Contains all mine identification numbers issued violation information.	for mines active or opened since 1971. The data also includes	
	Date of Government Version: 10/29/2017 Date Data Arrived at EDR: 11/28/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 45	Source: Department of Labor, Mine Safety and Health Administration Telephone: 303-231-5959 Last EDR Contact: 02/28/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Semi-Annually	
US N	IINES 2: Ferrous and Nonferrous Metal Mines I This map layer includes ferrous (ferrous metal ore or molybdenum) and nonferrous (Nonferrou as gold, silver, copper, zinc, and lead) metal mi	Database Listing mines are facilities that extract ferrous metals, such as iron us metal mines are facilities that extract nonferrous metals, such ines in the United States.	
	Date of Government Version: 12/05/2005 Date Data Arrived at EDR: 02/29/2008 Date Made Active in Reports: 04/18/2008 Number of Days to Update: 49	Source: USGS Telephone: 703-648-7709 Last EDR Contact: 03/02/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Varies	
US N	IINES 3: Active Mines & Mineral Plants Databa Active Mines and Mineral Processing Plant ope of the USGS.	se Listing erations for commodities monitored by the Minerals Information Team	
	Date of Government Version: 04/14/2011 Date Data Arrived at EDR: 06/08/2011 Date Made Active in Reports: 09/13/2011 Number of Days to Update: 97	Source: USGS Telephone: 703-648-7709 Last EDR Contact: 03/02/2018 Next Scheduled EDR Contact: 06/11/2018 Data Release Frequency: Varies	

#### ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/25/2017 Date Data Arrived at EDR: 09/26/2017 Date Made Active in Reports: 10/20/2017 Number of Days to Update: 24 Source: Department of Interior Telephone: 202-208-2609 Last EDR Contact: 12/19/2017 Next Scheduled EDR Contact: 03/26/2018 Data Release Frequency: Quarterly

# FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/23/2017	Source: EPA
Date Data Arrived at EDR: 09/06/2017	Telephone: (4
Date Made Active in Reports: 09/15/2017	Last EDR Cor
Number of Days to Update: 9	Next Schedule

Source: EPA Telephone: (415) 947-8000 Last EDR Contact: 02/23/2018 Next Scheduled EDR Contact: 06/18/2018 Data Release Frequency: Quarterly

#### UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016 Date Data Arrived at EDR: 10/31/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 73 Source: Department of Defense Telephone: 703-704-1564 Last EDR Contact: 01/02/2018 Next Scheduled EDR Contact: 04/30/2018 Data Release Frequency: Varies

# ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/13/2018 Date Data Arrived at EDR: 01/19/2018 Date Made Active in Reports: 03/02/2018 Number of Days to Update: 42 Source: Environmental Protection Agency Telephone: 202-564-2280 Last EDR Contact: 01/19/2018 Next Scheduled EDR Contact: 03/19/2018 Data Release Frequency: Quarterly

#### DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 06/27/2017	Source: Environmental Protection Agency
Date Data Arrived at EDR: 11/21/2017	Telephone: 202-564-0527
Date Made Active in Reports: 01/12/2018	Last EDR Contact: 03/02/2018
Number of Days to Update: 52	Next Scheduled EDR Contact: 06/11/2018
	Data Release Frequency: Varies

#### FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

	Date of Government Version: 11/20/2017 Date Data Arrived at EDR: 11/20/2017 Date Made Active in Reports: 01/12/2018 Number of Days to Update: 53	Source: EPA Telephone: 800-385-6164 Last EDR Contact: 02/21/2018 Next Scheduled EDR Contact: 06/04/2018 Data Release Frequency: Quarterly
AIRS	5: List of Permitted Facilities A listing of permitted facilities in the state.	
	Date of Government Version: 01/02/2018 Date Data Arrived at EDR: 01/04/2018 Date Made Active in Reports: 01/17/2018 Number of Days to Update: 13	Source: Department of Health Telephone: 808-586-4200 Last EDR Contact: 01/02/2018 Next Scheduled EDR Contact: 04/16/2018 Data Release Frequency: Varies
DRYCLEANERS: Permitted Drycleaner Facility Listing A listing of permitted drycleaner facilities in the state.		
	Date of Government Version: 01/02/2018 Date Data Arrived at EDR: 01/04/2018 Date Made Active in Reports: 01/17/2018 Number of Days to Update: 13	Source: Department of Health Telephone: 808-586-4200 Last EDR Contact: 01/02/2018 Next Scheduled EDR Contact: 04/16/2018 Data Release Frequency: Varies
Fina	ncial Assurance: Financial Assurance Informatic A listing of financial assurance information for u	on Listing nderground storage tank facilities. Financial assurance

A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 12/18/2017 Date Data Arrived at EDR: 12/26/2017 Date Made Active in Reports: 01/16/2018 Number of Days to Update: 21 Source: Department of Health Telephone: 808-586-4226 Last EDR Contact: 12/19/2017 Next Scheduled EDR Contact: 03/26/2018 Data Release Frequency: Varies

Next Scheduled EDR Contact: 06/11/2018

Source: Department of Health

Last EDR Contact: 02/22/2018

Data Release Frequency: Varies

Telephone: 808-586-4258

UIC: Underground Injection Wells Listing A listing of underground injection well locations.

Date of Government Version: 02/07/2013 Date Data Arrived at EDR: 02/12/2013 Date Made Active in Reports: 04/09/2013 Number of Days to Update: 56

# EDR HIGH RISK HISTORICAL RECORDS

#### EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A Date Data Arrived at EDR: N/A Date Made Active in Reports: N/A Number of Days to Update: N/A Source: EDR, Inc. Telephone: N/A Last EDR Contact: N/A Next Scheduled EDR Contact: N/A Data Release Frequency: No Update Planned
## **GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING**

#### EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A Date Data Arrived at EDR: N/A Date Made Active in Reports: N/A Number of Days to Update: N/A Source: EDR, Inc. Telephone: N/A Last EDR Contact: N/A Next Scheduled EDR Contact: N/A Data Release Frequency: Varies

#### EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A Date Data Arrived at EDR: N/A Date Made Active in Reports: N/A Number of Days to Update: N/A Source: EDR, Inc. Telephone: N/A Last EDR Contact: N/A Next Scheduled EDR Contact: N/A Data Release Frequency: Varies

#### EDR RECOVERED GOVERNMENT ARCHIVES

#### **Exclusive Recovered Govt. Archives**

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A Date Data Arrived at EDR: 07/01/2013 Date Made Active in Reports: 01/08/2014 Number of Days to Update: 191 Source: Department of Health Telephone: N/A Last EDR Contact: 06/01/2012 Next Scheduled EDR Contact: N/A Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A	Source: Department of Health
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 01/17/2014	Last EDR Contact: 06/01/2012
Number of Days to Update: 200	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Date of Government Version: N/A Date Data Arrived at EDR: 07/01/2013 Date Made Active in Reports: 01/03/2014 Number of Days to Update: 186 Source: Department of Health Telephone: N/A Last EDR Contact: 06/01/2012 Next Scheduled EDR Contact: N/A Data Release Frequency: Varies

## **OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

#### **Oil/Gas Pipelines**

Source: PennWell Corporation

Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

#### Electric Power Transmission Line Data

Source: PennWell Corporation

This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:

Source: American Hospital Association, Inc.

Telephone: 312-280-5991

The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing

Source: Centers for Medicare & Medicaid Services

Telephone: 410-786-3000

A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services,

a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes

Source: National Institutes of Health

Telephone: 301-594-6248

Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on elementary

and secondary public education in the United States. It is a comprehensive, annual, national statistical

database of all public elementary and secondary schools and school districts, which contains data that are

comparable across all states.

Private Schools

Source: National Center for Education Statistics

Telephone: 202-502-7300

The National Center for Education Statistics' primary database on private school locations in the United States.

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA Telephone: 877-336-2627 Date of Government Version: 2003, 2015

## **GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING**

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory Source: Office of Planning Telephone: 808-587-2895

Current USGS 7.5 Minute Topographic Map Source: U.S. Geological Survey

## STREET AND ADDRESS INFORMATION

© 2015 TomTom North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

## **GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM**

## TARGET PROPERTY ADDRESS

525 PIILANI STREET 525 PIILANI STREET HILO, HI 96720

## TARGET PROPERTY COORDINATES

Latitude (North):	19.71721 - 19 <sup>°</sup> 43' 1.96"
Longitude (West):	155.070996 - 155° 4' 15.59"
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	282938.7
UTM Y (Meters):	2181382.2
Elevation:	12 ft. above sea level

#### USGS TOPOGRAPHIC MAP

Target Property Map:	5949390 HILO, HI
Version Date:	2013

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

- 1. Groundwater flow direction, and
- 2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

## **GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

## **TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

### TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General NW

## SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

## HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

#### FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
1551660880C	FEMA Q3 Flood data
Additional Panels in search area:	FEMA Source Type
1551660885C	FEMA Q3 Flood data
NATIONAL WETLAND INVENTORY	
NWI Quad at Target Property HILO	<u>Data Coverage</u> YES - refer to the Overview Map and Detail Map

## HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

#### **AQUIFLOW®**

Search Radius: 1.000 Mile.

MAP ID

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

Not Reported

LOCATION

FROM TP

GENERAL DIRECTION **GROUNDWATER FLOW** 

## **GROUNDWATER FLOW VELOCITY INFORMATION**

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

## **GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY**

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

## **ROCK STRATIGRAPHIC UNIT**

#### **GEOLOGIC AGE IDENTIFICATION**

Era:	-	Category:	-
System:	-		
Series:	-		
Code:	N/A	(decoded above as Era, System & Series)	

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).





SITE NAME: ADDRESS: LAT/LONG:	525 Piilani Street 525 Piilani Street Hilo HI 96720 19.71721 / 155.070996	CLIENT: CONTACT: INQUIRY #: DATE:	Lehua Environmental Consultants, LLC Kama 5207731.2s March 05, 2018 1:00 pm
		Copyrig	ght © 2018 EDR, Inc. © 2015 TomTom Rel. 2015.

## DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1	
Soil Component Name:	Keaukaha
Soil Surface Texture:	muck
Hydrologic Group:	Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.
Soil Drainage Class:	Well drained
Hydric Status: Partially hydric	
Corrosion Potential - Uncoated Steel:	Moderate
Depth to Bedrock Min:	> 0 inches
Depth to Watertable Min:	> 0 inches

Soil Layer Information							
Boundary Classification Saturated by draulic							
Layer	Upper	Lower	Soil Texture Class	AASHTO Group Unified Soil cor		conductivity micro m/sec	Soil Reaction (pH)
1	0 inches	7 inches	muck	A-8	Highly organic soils, Peat.	Max: 141 Min: 42.34	Max: Min:
2	7 inches	18 inches	bedrock	Not reported	Not reported	Max: 0.42 Min: 0.02	Max: Min:

## LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

## WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 0.001 miles
State Database	1.000

## FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS40000268579	1/4 - 1/2 Mile SSW
B7	USGS40000268588	1/4 - 1/2 Mile NNE
B8	USGS40000268590	1/4 - 1/2 Mile NNE
B9	USGS40000268591	1/4 - 1/2 Mile NNE
B10	USGS40000268589	1/4 - 1/2 Mile NNE
B11	USGS40000268587	1/4 - 1/2 Mile NNE
12	USGS40000268586	1/2 - 1 Mile NE
13	USGS40000268582	1/2 - 1 Mile East

## FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

		LOCATION
MAP ID	WELL ID	FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

## STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	HI900000004305	1/4 - 1/2 Mile SSW
B3	HI900000004317	1/4 - 1/2 Mile NNE
B4	HI900000004316	1/4 - 1/2 Mile NNE
B5	HI900000004319	1/4 - 1/2 Mile NNE
B6	HI900000004318	1/4 - 1/2 Mile NNE
C14	HI900000004300	1/2 - 1 Mile SE
C15	HI900000004301	1/2 - 1 Mile SE

## **PHYSICAL SETTING SOURCE MAP - 5207731.2s**



SITE NAME: 525 Piilani Street	CLIENT: Lehua Environmental Consultants, LLC
ADDRESS: 525 Piilani Street	CONTACT: Kama
Hilo HI 96720	INQUIRY #: 5207731.2s
LAT/LONG: 19.71721 / 155.070996	DATE: March 05, 2018 1:00 pm

Map ID Direction				
Distance Elevation			Database	EDR ID Number
A1				11000400000570
ssw 1/4 - 1/2 Mile Higher			FED USGS	USGS40000268579
Org. Identifier:	USGS-HI			
Formal name:	USGS Hawaii Water Science	Center		
Monloc Identifier:	USGS-194258155043401			
Monloc name:	8-4204-01 WAIAKEA VILLAG	E		
Monloc type:	Well			
Monloc desc:	Not Reported			
Huc code:	20010000	Drainagearea value:	Not Reported	
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported	
Contrib drainagearea units:	Not Reported	Latitude:	19.7130724	
Longitude:	-155.073342	Sourcemap scale:	24000	
Horiz Acc measure:	1	Horiz Acc measure units:	seconds	
Horiz Collection method:	Interpolated from map			
Horiz coord refsys:	NAD83	Vert measure val:	15.00	
Vert measure units:	feet	Vertacc measure val:	5	
Vert accmeasure units:	feet			
Vertcollection method:	Interpolated from topographic	map		
Vert coord refsys:	HILOCAL	Countrycode:	US	
Aquifername:	Not Reported			
Formation type:	Not Reported			
Aquifer type:	Not Reported			
Construction date:	19710101	Welldepth:	35	
Welldepth units:	ft	Wellholedepth:	35	
Wellholedepth units:	ft			
Ground-water levels, Numb	er of Measurements: 0			
A2				
SSW 1/4 - 1/2 Mile Higher			HI WELLS	HI900000004305
Wid:	8-4204-001	Island:	Hawaii	
Well name:	Wajakea Village	Old name:	Not Reported	
Yr drilled:	1971			
Driller:	Roscoe Moss Hawaii Inc			
Quad map:	67			
Long83dd:	-155.073333			
Lat83dd:	19.713056			
Gps <sup>.</sup>	0	Utm <sup>.</sup>	-1	
Owner user:	Not Reported			
Land owner:	Not Reported			
Pump insta:	Not Reported			
Old number:	Not Reported	Well type:	PER	
Casing dia	14	Ground el	Not Reported	
Well depth:	35			
Solid case:	25	Perf case:	35	
Use:	IND - Industrial		20	
Use year	Not Reported			
Init head	Not Reported	Init head?	Not Reported	
Init head3	Not Reported			
Init cl:	0			
Test date:	Not Reported	Test gpm:	1250	
	- · · · - l · ·	01		

Test ddown:	2.4	Test chlor:	Not Reported	
Test temp:	Not Reported	Test unit:	Not Reported	
Pump gpm:	700			
Draft mgy:	Not Reported	Head feet:	Not Reported	
Max chlor:	Not Reported	Min chlor:	Not Reported	
Geology:	QKL			
Pump yr:	0			
Draft yr:	Not Reported	Bot hole:	Not Reported	
Bot solid:	Not Reported	Bot perf:	Not Reported	
Spec capac:	521			
Pump mgd:	1.008			
Draft mgd:	Not Reported	Pump elev:	Not Reported	
Pump depth:	Not Reported	Tmk:	Not Reported	
Aqui code:	80401			
Latest hd:	Not Reported	Wcr:	06-AUG-71	
Pir:	Not Reported			
Surveyor:	Not Reported			
T:	Not Reported	Site id:	HI900000004305	
			HI WELLS	HI900000004317
1/4 - 1/2 Mile				
Wid:	8-4304-002	Island:	Hawaii	
Well name:	Shipman 2	Old name:	Not Reported	
Yr drilled:	1957			
Driller:	Bechtel			
Quad map:	67			
Long83dd:	-155.068889			
Lat83dd:	19.723889			
Gps:	0	Utm:	-1	
Owner user:	Hawaii Electric Light Co	o., Inc., HELCO		
Land owner:	Not Reported			
Pump insta:	Not Reported			
Old number:	Not Reported	Well type:	DUG	
Casing dia:	84	Ground el:	10	
Well depth:	26			
Solid case:	Not Reported	Perf case:	Not Reported	
Use:	UNU - Unused			
Use year:	Not Reported			
Init head:	Not Reported	Init head2:	Not Reported	
Init head3:	Not Reported			
Init cl:	0			
Test date:	Not Reported	Test gpm:	Not Reported	
Test ddown:	Not Reported	Test chlor:	Not Reported	
Test temp:	Not Reported	Test unit:	Not Reported	
Pump gpm:	6600			
Draft mgy:	Not Reported	Head feet:	Not Reported	
Max chlor:	Not Reported	Min chlor:	Not Reported	
Geology:	QKL			
Pump yr:	0			
Draft yr:	Not Reported	Bot hole:	-16	
Bot solid:	Not Reported	Bot perf:	Not Reported	
Spec capac:	Not Reported			

Pump mgd:	9.504			
Draft mgd:	Not Reported	Pump elev:	Not Reported	
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024	
Aqui code:	80401			
Latest hd:	Not Reported	Wcr:	01-JAN-57	
Pir	Not Reported			
Surveyor	Not Reported			
T.	Not Reported	Site id	HI900000004317	
B4				HI00000004216
1/4 - 1/2 Mile Lower				111500000000000
Wid	8-4304-001	Island <sup>.</sup>	Hawaii	
Well name:	Shinman 1A 1B	Old name:	Not Benorted	
Vr drilled	1943	old hame.	Not hopolied	
Driller:	Bechtel			
Ound man:	67			
Quau map.	155.069990			
Longoodu.	-105.000009			
Calobuu.	19.723069	L Itm-	4	
Gps.	U Howaii Electric Light Co		-1	
Owner user.	Net Departed	, IIIC., HELCO		
Land Owner.	Not Reported			
Pump insta.	Not Reported		Not Departed	
		over type.		
Casing dia:	54	Ground el:	12	
vveil deptn:	20 Not Dependente d	Darfassa	Net Devented	
Solid case:	Not Reported		Not Reported	
Use:	IND - Geothermal, Therm	noelectric Cooling, Power De		
Use year:	Not Reported		Not Deve de d	
Init nead:	Not Reported	Init nead2:	Not Reported	
Init head3:	Not Reported			
	U	<b>-</b> .		
lest date:	Not Reported	Test gpm:	Not Reported	
lest ddown:	Not Reported	lest chlor:	Not Reported	
l est temp:	Not Reported	l est unit:	Not Reported	
Pump gpm:	5400			
Draft mgy:	Not Reported	Head feet:	Not Reported	
Max chlor:	Not Reported	Min chlor:	Not Reported	
Geology:	Not Reported			
Pump yr:	0			
Draft yr:	Not Reported	Bot hole:	-8	
Bot solid:	Not Reported	Bot perf:	Not Reported	
Spec capac:	Not Reported			
Pump mgd:	7.776			
Draft mgd:	Not Reported	Pump elev:	Not Reported	
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024	
Aqui code:	80401			
Latest hd:	Not Reported	Wcr:	01-JAN-43	
Pir:	Not Reported			
Surveyor:	Not Reported			
T:	Not Reported	Site id:	HI900000004316	

Map ID				
Distance			Databasa	
			Database	EDR ID Number
B5 NNE 1/4 - 1/2 Mile Lower			HI WELLS	HI900000004319
Wid:	8-4304-004	Island:	Hawaii	
Well name:	Shipman 4A 4B	Old name:	Not Reported	
Yr drilled:	1970		·	
Driller:	Not Reported			
Quad map:	67			
Long83dd:	-155.068889			
Lat83dd:	19.723889			
Gps:	0	Utm:	-1	
Owner user:	Hawaii Electric Light Co.	, Inc., HELCO		
Land owner:	Not Reported			
Pump insta:	Not Reported			
Old number:	Not Reported	Well type:	DUG	
Casing dia:	Not Reported	Ground el:	10	
Well depth:	20			
Solid case:	Not Reported	Perf case:	Not Reported	
Use:	IND - Geothermal, Thern	noelectric Cooling, Power De	·	
Use year:	Not Reported	-		
Init head:	Not Reported	Init head2:	Not Reported	
Init head3:	Not Reported			
Init cl:	19000			
Test date:	Not Reported	Test gpm:	Not Reported	
Test ddown:	Not Reported	Test chlor:	Not Reported	
Test temp:	Not Reported	Test unit:	Not Reported	
Pump gpm:	8800			
Draft mgy:	Not Reported	Head feet:	Not Reported	
Max chlor:	Not Reported	Min chlor:	Not Reported	
Geology:	Not Reported			
Pump yr:	0			
Draft yr:	Not Reported	Bot hole:	-10	
Bot solid:	Not Reported	Bot perf:	Not Reported	
Spec capac:	Not Reported			
Pump mgd:	12.672			
Draft mgd:	Not Reported	Pump elev:	Not Reported	
Pump depth:	Not Reported	Tmk:	(3) 2-1-001:024	
Aqui code:	80401			
Latest hd:	Not Reported	Wcr:	01-JAN-70	
Pir:	Not Reported			
Surveyor:	Not Reported			
T:	Not Reported	Site id:	HI900000004319	
B6 NNE 1/4 - 1/2 Mile Lower			HI WELLS	HI900000004318
Wid:	8-4304-003	Island:	Hawaii	
Well name:	Shipman 3	Old name:	Not Reported	
Yr drilled:	1971			
Driller:	Bechtel			
Quad map:	67			

Utm:

Long83dd:

Owner user:

Land owner:

Lat83dd:

Gps:

-155.068889

Not Reported

Hawaii Electric Light Co., Inc., HELCO

19.723889 0

Pump insta: Old number: Casing dia: Well depth: Solid case: Use: Use year: Init head: Init head3: Init cl: Test date: Test ddown: Test temp: Pump gpm: Draft mgy: Max chlor: Geology: Pump yr: Draft yr: Bot solid: Spec capac: Pump mgd: Draft mgd: Pump depth: Aqui code: Latest hd: Pir: Surveyor: T:

B7 NNE

1/4 - 1/2 Mile Lower

Not Reported	
Not Reported	Well type:
Not Reported	Ground el:
20	
Not Reported	Perf case:
IND - Geothermal, Thermoelectric	Cooling, P
Not Reported	
Not Reported	Init head2:
Not Reported	
10000	
Not Reported	Test gpm:
Not Reported	Test chlor:
Not Reported	Test unit:
6600	
Not Reported	Head feet:
Not Reported	Min chlor:
QKL	
0	
Not Reported	Bot hole:
Not Reported	Bot perf:
Not Reported	
9.504	
Not Reported	Pump elev
Not Reported	Tmk:
80401	
Not Reported	Wcr:
Not Reported	
Not Reported	
Not Reported	Site id:

Vell type: Ground el: Perf case: Cooling, Power De

Pump elev: ſmk:

Not Reported

-10

DUG

Not Reported

10

(3) 2-1-001:024

01-JAN-71

HI900000004318

FED USGS

USGS40000268588

Org. Identifier: Formal name:	USGS-HI USGS Hawaii Water Science Cer	nter	
Monloc Identifier:	USGS-194337155041602		
Monloc name:	8-4304.01B -04		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239051
Longitude:	-155.0688978	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	3
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic ma	lb.	
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

	Aquifer type: Construction date: Welldepth units: Wellholedepth units:	Not Reported 19710101 ft ft	Welldepth: Wellholedepth:	16 16	
	Ground-water levels, Numb	per of Measurements: 0			
Bi Ni 1/2	8 NE 4 - 1/2 Mile ower			FED USGS USGS400	000268590
	Org. Identifier: Formal name: Monloc Identifier: Monloc name: Monloc type: Monloc type: Monloc desc: Huc code: Drainagearea Units: Contrib drainagearea units: Longitude: Horiz Acc measure: Horiz Collection method: Horiz coord refsys: Vert measure units: Vert accmeasure units: Vert accmeasure units: Vert coord refsys: Aquifername: Formation type:	USGS-HI USGS Hawaii Water Science Cer USGS-194337155041801 8-4304-01 WAIAKEA DUG WELL Well Not Reported 20010000 Not Reported Not Reported -155.0688978 5 Interpolated from map NAD83 feet feet Interpolated from topographic mathic HILOCAL Not Reported Not Reported	nter Drainagearea value: Contrib drainagearea: Latitude: Sourcemap scale: Horiz Acc measure units: Vert measure val: Vertacc measure val: p Countrycode:	Not Reported Not Reported 19.7239051 24000 seconds 12.00 2 US	
	Aquifer type: Construction date: Welldepth units: Wellholedepth units:	Not Reported 19440101 ft ft	Welldepth: Wellholedepth:	20 20	
	Ground-water levels, Numb Feet below Date Surface 1972-04-05 12.47	per of Measurements: 1 Feet to Sealevel			

#### B9 NNE 1/4 - 1/2 Mile Lower

Org. Identifier:	USGS-HI	
Formal name:	USGS Hawaii Water Science Cer	nter
Monloc Identifier:	USGS-194337155041802	
Monloc name:	8-4304.01A	
Monloc type:	Well	
Monloc desc:	Not Reported	
Huc code:	20010000	Drainagearea value:
Drainagearea Units:	Not Reported	Contrib drainagearea:
Contrib drainagearea units:	Not Reported	Latitude:
Longitude:	-155.0688978	Sourcemap scale:

Not Reported Not Reported 19.7239051 24000

FED USGS

USGS40000268591

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	8.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic	c map	
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported	-	
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19700101	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported	•	•

Ground-water levels, Number of Measurements: 0

# B10 NNE 1/4 - 1/2 Mile Lower

FED USGS USGS40000268589

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Cer	nter	
Monloc Identifier:	USGS-194337155041701		
Monloc name:	8-4304-02 WAIAKEA DUG WELL	-	
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7239052
Longitude:	-155.06862	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.20
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Hawaii volcanic-rock aquifers		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19530101	Welldepth:	20
Welldepth units:	ft	Wellholedepth:	20
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

# B11 NNE 1/4 -Lowe

GS USGS40000268587	FED USGS			NE 4 - 1/2 Mile wer
			USGS-HI	Org. Identifier:
		ce Center	USGS Hawaii Water Scie	Formal name:
			USGS-194337155041601	Monloc Identifier:
			8-4304-03 WAIAKEA	Monloc name:
			Well	Monloc type:
			Not Reported	Monloc desc:
	Not Reported	Drainagearea value:	20010000	Huc code:
	Not Reported	Contrib drainagearea:	Not Reported	Drainagearea Units:
	19.7239052	Latitude:	Not Reported	Contrib drainagearea units:
	24000	Sourcemap scale:	-155.0683422	Longitude:
	Not Reported Not Reported 19.7239052 24000	e Center Drainagearea value: Contrib drainagearea: Latitude: Sourcemap scale:	USGS-HI USGS Hawaii Water Scie USGS-194337155041601 8-4304-03 WAIAKEA Well Not Reported 20010000 Not Reported Not Reported -155.0683422	Org. Identifier: Formal name: Monloc Identifier: Monloc name: Monloc type: Monloc desc: Huc code: Drainagearea Units: Contrib drainagearea units: Longitude:

Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.20
Vert measure units:	feet	Vertacc measure val:	.1
Vert accmeasure units:	feet		
Vertcollection method:	Level or other surveying method		
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	19570101	Welldepth:	25.5
Welldepth units:	ft	Wellholedepth:	25.5
Wellholedepth units:	ft		

Ground-water levels, Number of Measurements: 0

#### 12 NE 1/2 - 1 Mile Lower

USGS40000268586

FED USGS

Org. Identifier:	USGS-HI		
Formal name:	USGS Hawaii Water Science Cer	nter	
Monloc Identifier:	USGS-194334155035801		
Monloc name:	8-4303.02		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	20010000	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	19.7230719
Longitude:	-155.0633422	Sourcemap scale:	24000
Horiz Acc measure:	1	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	10.00
Vert measure units:	feet	Vertacc measure val:	1
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic ma	р	
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		-

Ground-water levels, Number of Measurements: 0

#### 13 East 1/2 - 1 Mi Higher

st 2 - 1 Mile gher			FED USGS	USGS40000268582
Org. Identifier:	USGS-HI			
Formal name:	USGS Hawaii Water Science	Center		
Monloc Identifier:	USGS-194317155034601			
Monloc name:	8-4303.01			
Monloc type:	Well			
Monloc desc:	Not Reported			
Huc code:	20010000	Drainagearea value:	Not Reported	
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported	
Contrib drainagearea units:	Not Reported	Latitude:	19.71835	
Longitude:	-155.0600088	Sourcemap scale:	24000	

Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	20.00
Vert measure units:	feet	Vertacc measure val:	5
Vert accmeasure units:	feet		
Vertcollection method:	Interpolated from topographic m	ap	
Vert coord refsys:	HILOCAL	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

### C14 SE 1/2 - 1 Mile Higher

Wid:	8-4203-013	Island:	Hawaii
Well name:	Glover Quarry A	Old name:	Not Reported
Yr drilled:	1948		
Driller:	Jas. W. Glover, Ltd.		
Quad map:	67		
Long83dd:	-155.059444		
Lat83dd:	19.709167		
Gps:	0	Utm:	-1
Öwner user:	Jas. W. Glover, Ltd.		
Land owner:	Not Reported		
Pump insta:	Not Reported		
Old number:	Not Reported	Well type:	DUG
Casing dia:	72	Ground el:	23
Well depth:	25		
Solid case:	Not Reported	Perf case:	Not Reported
Use:	IND - Mining, Dust Control		
Use year:	Not Reported		
Init head:	Not Reported	Init head2:	Not Reported
Init head3:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	Not Reported	Test unit:	Not Reported
Pump gpm:	600		
Draft mgy:	Not Reported	Head feet:	Not Reported
Max chlor:	Not Reported	Min chlor:	Not Reported
Geology:	Not Reported		
Pump yr:	1984		
Draft yr:	Not Reported	Bot hole:	-2
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported		
Pump mgd:	.864		
Draft mgd:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Tmk:	Not Reported
Aqui code:	80401		
Latest hd:	Not Reported	Wcr:	01-JAN-48
Pir:	Not Reported		
Surveyor:	Not Reported		
Т:	Not Reported	Site id:	HI900000004300

HI WELLS

HI900000004300

Map ID Direction Distance				
Elevation			Database	EDR ID Number
C15 SE 1/2 - 1 Mile Higher			HI WELLS	HI900000004301
Wid:	8-4203-014	Island:	Hawaii	
Well name:	Glover Quarry B	Old name:	Not Reported	
Yr drilled:	1948			
Driller:	Jas. W. Glover, Ltd.			
Quad map:	67			
Long83dd:	-155.058889			
Lat83dd:	19.709444			
Gps:	0	Utm:	-1	
Owner user:	Jas. W. Glover, Ltd.			
Land owner:	Not Reported			
Pump insta:	Not Reported			
Old number:	Not Reported	Well type:	DUG	
Casing dia:	72	Ground el:	23	
Well depth:	25			
Solid case:	Not Reported	Perf case:	Not Reported	
Use:	IND - Mining, Dust Control			
Use year:	Not Reported			
Init head:	Not Reported	Init head2:	Not Reported	
Init head3:	Not Reported			
Init cl:	0			
Test date:	Not Reported	Test gpm:	Not Reported	
Test ddown:	Not Reported	Test chlor:	Not Reported	
Test temp:	Not Reported	Test unit:	Not Reported	
Pump gpm:	350			
Draft mgy:	Not Reported	Head feet:	Not Reported	
Max chlor:	Not Reported	Min chlor:	Not Reported	
Geology:	Not Reported			
Pump yr:	1984			
Draft yr:	Not Reported	Bot hole:	-2	
Bot solid:	Not Reported	Bot perf:	Not Reported	
Spec capac:	Not Reported			
Pump mgd:	.504			
Draft mgd:	Not Reported	Pump elev:	Not Reported	
Pump depth:	Not Reported	Tmk:	Not Reported	
Aqui code:	80401			
Latest hd:	Not Reported	Wcr:	01-JAN-48	
Pir:	Not Reported			
Surveyor:	Not Reported			
T:	Not Reported	Site id:	HI900000004301	

## AREA RADON INFORMATION

Federal EPA Radon Zone for HAWAII County: 3

Note: Zone 1 indoor average level > 4 pCi/L.

: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L. : Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 96720

## Number of sites tested: 43

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	-0.112 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	-0.106 pCi/L	100%	0%	0%

#### **TOPOGRAPHIC INFORMATION**

USGS 7.5' Digital Elevation Model (DEM)

Source: United States Geologic Survey

EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map Source: U.S. Geological Survey

#### HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.

Source: FEMA Telephone: 877-336-2627 Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory Source: Office of Planning Telephone: 808-587-2895

### HYDROGEOLOGIC INFORMATION

AQUIFLOW<sup>R</sup> Information System

Source: EDR proprietary database of groundwater flow information

EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

#### **GEOLOGIC INFORMATION**

#### Geologic Age and Rock Stratigraphic Unit

Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

#### STATSGO: State Soil Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS) The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database

Source: Department of Agriculture, Natural Resources Conservation Service (NRCS) Telephone: 800-672-5559

SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

## PHYSICAL SETTING SOURCE RECORDS SEARCHED

#### LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data

Source: EPA/Office of Drinking Water

Telephone: 202-564-3750

Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS) This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii

#### **OTHER STATE DATABASE INFORMATION**

RADON

Area Radon Information Source: USGS Telephone: 703-356-4020 The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones Source: EPA Telephone: 703-356-4020 Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

### OTHER

Airport Landing Facilities: Private and public use landing facilities Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

## PHYSICAL SETTING SOURCE RECORDS SEARCHED

## STREET AND ADDRESS INFORMATION

© 2015 TomTom North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

## 525 Piilani Street

525 Piilani Street Hilo, HI 96720

Inquiry Number: 5207731.9 March 05, 2018

## **The EDR Aerial Photo Decade Package**



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

## EDR Aerial Photo Decade Package

## Site Name:

## Client Name:

03/05/18

525 Piilani Street 525 Piilani Street Hilo, HI 96720 EDR Inquiry # 5207731.9

## Lehua Environmental Consultants, LLC P.O. Box 1018 Kamuela, HI 96743 Contact: Kama



Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

Search Results:				
<u>Year</u>	Scale	Details	Source	
2000	1"=500'	Acquisition Date: June 16, 2000	USGS/DOQQ	
1992	1"=500'	Flight Date: September 30, 1992	USGS	
1988	1"=500'	Flight Date: October 01, 1988	USGS	
1985	1"=500'	Flight Date: March 11, 1985	USGS	
1977	1"=500'	Flight Date: January 03, 1977	USGS	
1975	1"=1000'	Flight Date: July 17, 1975	USGS	
1954	1"=500'	Flight Date: April 10, 1954	USGS	

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

#### **Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental risk for any property is not to be construed as legal advice.

Copyright 2018 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.















525 Piilani Street 525 Piilani Street Hilo, HI 96720

Inquiry Number: 5207731.4 March 05, 2018

## EDR Historical Topo Map Report with QuadMatch™



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

EDR Historical Topo Map Report			
Site Name:	Client Name:		
525 Piilani Street 525 Piilani Street	Lehua Environmental Consultants, LLC	<b>EDR</b> °	

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by Lehua Environmental Consultants, LLC were identified for the years listed below. EDR's Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Kamuela, HI 96743

Contact: Kama

Hilo, HI 96720

EDR Inquiry # 5207731.4

Search Results	:	Coordinates:	
P.O.#	NA	Latitude:	19.71721 19° 43' 2" North
Project:	NA	Longitude:	-155.070996 -155° 4' 16" West
		UTM Zone:	Zone 5 North
		UTM X Meters:	282942.00
		UTM Y Meters:	2181512.15
		Elevation:	11.97' above sea level
Maps Provided	:		
2013			
1995			
1981			
1980			
1963			
1932			
1917			
1914			

#### **Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report as legal advice.

Copyright 2018 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.
#### **Topo Sheet Key**

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

#### 2013 Source Sheets



Hilo

7.5-minute, 24000

#### **1995 Source Sheets**



Hilo

7.5-minute, 24000 Aerial Photo Revised 1995

#### **1981 Source Sheets**



Hilo

7.5-minute, 24000 Aerial Photo Revised 1977

#### **1980 Source Sheets**



HILO

15-minute, 50000

#### **Topo Sheet Key**

This EDR Topo Map Report is based upon the following USGS topographic map sheets.

#### **1963 Source Sheets**



Hilo

7.5-minute, 24000 Aerial Photo Revised 1961

#### **1932 Source Sheets**



Hilo

15-minute, 62500

#### **1917 Source Sheets**



Hilo

15-minute, 62500

#### **1914 Source Sheets**



WAIAKEA

7.5-minute, 31680



S

5207731 - 4 page 5



SW

S

SE

5207731 - 4

page 6









5207731 - 4 page 10



SW

S

SE

5207731 - 4

page 11







525 Piilani Street 525 Piilani Street Hilo, HI 96720

Inquiry Number: 5207731.3 March 05, 2018

# **Certified Sanborn® Map Report**



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

# 03/05/18Site Name:Client Name:525 Piilani StreetLehua Environmental Consultants, LLC525 Piilani StreetP.O. Box 1018Hilo, HI 96720Kamuela, HI 96743EDR Inquiry # 5207731.3Contact: Kama

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Lehua Environmental Consultants, LLC 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 Sanbo	rn Results:	
Certification #	9DEA-4B20-AB9F	
PO #	NA	
Project	NA	
Maps Provided:		Sanborn® Library search results
1991		Certification #: 9DEA-4B20-AB9F
1987		
1978		The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn. Bromley, Perris &
1974		Browne, Hopkins, Barlow and others which track
1957		American cities and towns. Collections searched:
1921		<ul> <li>Library of Congress</li> <li>University Publications of America</li> <li>EDR Private Collection</li> </ul>

#### The Sanborn Library LLC Since 1866™

#### Limited Permission To Make Copies

Lehua Environmental Consultants, LLC (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

#### **Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provide in this Report is not to be construed as legal advice.

Copyright 2018 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

#### Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.



#### **1991 Source Sheets**



Volume 1, Sheet 30

#### **1987 Source Sheets**



Volume 1, Sheet 30

#### **1978 Source Sheets**



Volume 1, Sheet 30

#### **1974 Source Sheets**



Volume 1, Sheet 30

#### Sanborn Sheet Key

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.



#### **1957 Source Sheets**



Volume 1, Sheet 30

#### **1921 Source Sheets**

- H	2	17 .		30	A.m.	30
		1		tir ,	-	Ð
1.2	N. 15	1	- 24	-		
		1		-	- 1	
1 1		1	. 2.1	-		
- N 15	1.0	1.			- 00	
	5	12	2.5	2		
1 15	12	1.5				
	12	L		-	-	-
		8		-		
1.1		12-	-	-	-	
1 11 12 12	1.1	12-		0.1		
	-	6/		- 14		
	-			10+1		
			1	1	27	
			6		-	
-	-	10		21	- 22	-
	6 2	10				
	0					
		9		51.13		-
	1.88		011	1.2		
(m))	19.4%	11119	- 1 al	4	14	1

Volume 1, Sheet 30



30

# **Certified Sanborn® Map**







30

# **Certified Sanborn® Map**







# **Certified Sanborn® Map**





30

5207731 - 3 page 7



900 80 m

30

# **Certified Sanborn® Map**







# **Certified Sanborn® Map**





30



# **Certified Sanborn® Map**





1921



0 Feet

150

This Certified Sanborn Map combines the following sheets. Outlined areas indicate map sheets within the collection.

Volume 1, Sheet 30



30



- 2"WP - -

#### 525 Piilani Street

525 Piilani Street Hilo, HI 96720

Inquiry Number: 5207731.5 March 05, 2018

# The EDR-City Directory Image Report



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

#### **TABLE OF CONTENTS**

#### **SECTION**

**Executive Summary** 

Findings

**City Directory Images** 

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

#### **Disclaimer - Copyright and Trademark Notice**

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OR DAMAGE, INCLUDING. WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT. Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction orforecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2017 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc. or its affiliates is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

# **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.

#### **RECORD SOURCES**

EDR's Digital Archive combines historical directory listings from sources such as Cole Information and Dun & Bradstreet. These standard sources of property information complement and enhance each other to provide a more comprehensive report.

EDR is licensed to reproduce certain City Directory works by the copyright holders of those works. The purchaser of this EDR City Directory Report may include it in report(s) delivered to a customer. Reproduction of City Directories without permission of the publisher or licensed vendor may be a violation of copyright.



#### **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.

<u>Year</u>	<u>Target Street</u>	<u>Cross Street</u>	<u>Source</u>
2014	$\checkmark$	$\checkmark$	EDR Digital Archive
2010	$\checkmark$	$\checkmark$	EDR Digital Archive
2005	$\checkmark$	$\checkmark$	EDR Digital Archive
2000	$\checkmark$	$\checkmark$	EDR Digital Archive
1995	$\checkmark$	$\checkmark$	EDR Digital Archive
1992	$\checkmark$	$\checkmark$	EDR Digital Archive
1987	$\checkmark$	$\checkmark$	EDR Digital Archive
1982	$\checkmark$		EDR Digital Archive
1977	$\checkmark$	$\checkmark$	EDR Digital Archive

# **FINDINGS**

#### TARGET PROPERTY STREET

525 Piilani Street Hilo, HI 96720

<u>CD Image</u>	<u>Source</u>
pg A2	EDR Digital Archive
pg A4	EDR Digital Archive
pg A6	EDR Digital Archive
pg A8	EDR Digital Archive
pg A10	EDR Digital Archive
pg A12	EDR Digital Archive
pg A14	EDR Digital Archive
pg A15	EDR Digital Archive
pg A17	EDR Digital Archive
	CD Image pg A2 pg A4 pg A6 pg A8 pg A10 pg A12 pg A12 pg A14 pg A15 pg A17

# **FINDINGS**

#### **CROSS STREETS**

<u>Year</u>	<u>CD Image</u>	<u>Source</u>
<u>MANONO ST</u>		
2014	pg. A1	EDR Digital Archive
2010	pg. A3	EDR Digital Archive
2005	pg. A5	EDR Digital Archive
2000	pg. A7	EDR Digital Archive
1995	pg. A9	EDR Digital Archive
1992	pg. A11	EDR Digital Archive
1987	pg. A13	EDR Digital Archive
1982	-	EDR Digital Archive
1977	pg. A16	EDR Digital Archive

Street not listed in Source

**City Directory Images** 

-

# MANONO ST 2014

454	B & S ABURAMEN INC
	FREDDYS RESTAURANT
457	HILOHOOGANHJI
	KOYASAN SHINGON MISSION HAWAII
495	HAWAII GOVT EMPLOYEE ASSOC
500	HAWAII ISLAND PUB LNKS CMMTTEE
	ISLAND MORTGAGE
	LOVES BAKERY INC
	LY20 LLC
	TAKETA PATRICK Y APPRAISALS
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	CARTER, GAYLE A
	FUJII, KAYNE
	OCCUPANT UNKNOWN,
	ULTIMATE ROOFING INC
533	BEARDSLEY, BONNIE J
	OCCUPANT UNKNOWN,
542	CHARTRAND, LIONEL K
554	KE KILOHANA OKA MALAMALAMA
557	FLEMING & ASSOCIATES LLC
571	LEASURE, HILLARY M
573	AIANA, ANNETTE
	OCCUPANT UNKNOWN,
576	OCCUPANT UNKNOWN,



# PIILANI ST 2014

Cross Street

-

456	SIBAYAN, COREY
640	DEMELLO, ANTOINETTE M
	ELEGANT SERVICE VENTURES LLC
	T & C REALTY
648	ICC HOLDINGS LLC
	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
	ZAVARRO RHONDA
760	KIM S KARAOKE LOUNGE
	UN SIM MUKAI LLC
792	THELEN COLLIER
794	RICHARD CUNNINGHAM INC
799	HAWAII COUNTY RECREATION DIV
	RECREATION DIVISION
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON
	JOEYS
	KANOELEHUA INDUS AREA ASSN
	WONG LINDA E M
860	BOBS DISCOUNT TIRE

Target Street

-

# MANONO ST 2010

454	B & S ABURAMEN INC
	S YOKOYAMA INC
457	HILOHOOGANHJI
495	HAWAII GOVT EMPLOYEE ASSOC
500	ISLAND COMMUNITY LENDING CORP
	ISLAND MORTGAGE
	KALEHUA, ELDRED K
	LOVES BAKERY INC
	LY20 LLC
	TAKETA PATRICK Y APPRAISALS
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	FUJII, KAYNE
	PUUEO LIMITED PARTNERSHIP
	ULTIMATE ROOFING
533	BEARDSLEY, BONNIE
	OCCUPANT UNKNOWN,
542	CHARTRAND, LIONEL K
554	KE KILOHANA OKA MALAMALAMA
557	DURRANT GROUP INC (PC)
	FLEMING & ASSOCIATES LLC
	ODA MCCARTY ARCHITECTS LTD
573	KAUI, PATLYNN
	OCCUPANT UNKNOWN,



-

# PIILANI ST 2010

456	OCCUPANT UNKNOWN,
	SIBAYAN, KARLA
640	T & C REALTY
648	ICC HOLDINGS LLC
	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
760	MINAS LOUNGE INC
	UN SIM MUKAI LLC
792	KIRKENDALL KARL
	THELEN COLLIER
794	RICHARD CUNNINGHAM INC
799	LEARFIELD SPORT
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON
	HAWAII DRAFTING & DESIGN
	JOEYS
	KANOELEHUA INDUS AREA ASSN
	WONG LINDA E M
860	BOBS DISCOUNT TIRE

-

# MANONO ST 2005

323	HAWAII COUNTY FAIR 2004
454	S YOKOYAMA INC
457	HILOHOOGANHJI
495	HAWAII GOVT EMPLOYEE ASSOC
500	DAIICHIYA-LOVES BAKERY INC
	ISLAND CMNTY LNDING CRPRPATION
	TAKETA PATRICK Y SRA
	TRIPLE 7 AMUSEMENT
519	BIG ISLAND LAND CO LTD
	DHJS PROPERTIES INC
	OCCUPANT UNKNOWN,
	RE MAX PROPERTIES
524	TANAKA, CYNTHIA
533	BEARDSLEY, BONNIE
	BENNETT, R
	OCCUPANT UNKNOWN,
542	OCCUPANT UNKNOWN,
	SANBORN, DWAYNE
554	KE KILOHANA OKA MALAMALAMA
557	DURRANT GROUP INC
	ODA / MCCARTY ARCHITECTS LTD
571	BUTLER, JOHN
	SEGAWA, HIDEO
572	MORA, CHARLARAE M
	PAREL, LEONOR
576	YAMAGUCHI, NOBUJIRO



## PIILANI ST 2005

-

456	OCCUPANT UNKNOWN,
-50	

- 640 GOOD NEWS & PRISON MINISTRY T & C REALTY
- TOM ROWENA 648 ISEMOTO CONTRACTING CO LTD
- 670 HAWAII CAMPER TOPS CORP
- ZAVARRO RHONDA
- 760 MINAS LOUNGE INC792 KIRKENDALL KARL
- THELEN COLLIER
- 794 RICHARD CUNNINGHAM INC
- 810 ITSUS FISHING SUPPLIES INC

820 ADRIAN, J BEAUTY SALON HAWAII DRAFTING & DESIGN KANOELEHUA INDUS AREA ASSN LINDAS OJANO, STACY D WONG LINDA E M

# MANONO ST 2000

454	YOKOYAMA S INC

\_

- 457 HILOHOOGANHJI
- 495 H G E A

500	DAIICHIYA-LOVES BAKERY INC
	ISLAND COMMUNITY LENDING CORP
	ROSCOE STEVEN S CONSTRUCTION
	TAKETA PATRICK Y SRA
519	BRIGHT START INC
	INTERIM HEALTHCARE INC
504	

- 524 OCCUPANT UNKNOWN, 533 BEARDSLEY, BONNIE
- 542 BELL, TEDDY 542 CORDERO, JAMES
- 554 KE KILOHANA OKA MALAMALAMA OCCUPANT UNKNOWN,
- 557 OCCUPANT UNKNOWN, ODA-MC CARTY ARCHITECTS LTD
- 571 OCCUPANT UNKNOWN,

#### 573 GOMES, K L LANDGRAF, SHANNON



-

# PIILANI ST 2000

456	PETTI, B
640	OCCUPANT UNKNOWN,
	T & C REALTY
648	ISEMOTO CONTRACTING CO LTD
670	HAWAII CAMPER TOPS CORP
	PERKUP COFFEE SERVICE
760	MINAS LOUNGE INC
792	KIRKENDALL KARL
	KIRKENDALL, KARL
	THELEN COLLIER
794	CUNNINGHAM RICHARD INC
810	ITSUS FISHING SUPPLIES INC
820	BEAUTY SALON
	HAWAII DRAFTING & DESIGN
	LINDAS

-

# MANONO ST 1995

454	YOKOYAMA S INC
457	HILOHOOGANHJI
	KUKI, SOHKO
495	HGEA
500	LOVES BAKERY
	PLAYERS CHOICE INC
	TAKETA PATRICK Y SRA
	TAKETA, PATRICK Y
519	BARTMAN, A
	BRIGHT START INC
	INTERIM PERSONNEL
	PERSONNEL POOL TEMPORARY SVCS
524	JEWEL BOX ORCHIDS
533	BELL, TEDDY
	CIRCUS & CLOWNS UNLIMITED
	MASSMAN, SHELLY
	TAMAMOTO, HAJIME
542	CORDERO, JAMES
	TEIXEIRA, T
554	KE KILOHANA CHURCH
557	MURAKAMI, S
571	CLEMENT, JEREMY
572	ONGAIS, DAISY M
576	TANABE, ANTHONY J



Cross Street

-

Source EDR Digital Archive

## PIILANI ST 1995

- 525 HAWAIIAN SUN PRODUCTS INC
- 640 ITSUS FISHING SUPPLIES INC
- T & C REALTY
- 648 ISEMOTO CONTRACTING CO LTD
- 670 ZAVARRO RHONDA
- 760 CHAPMANS LAND & CATTLE CO MINAS LOUNGE INC
- 810 HIRANO, MITSURU
- 811 ALOHA LUMBER COMPANY INC
- 820 ALOHA LUMBER COMPANY INC AUSTIN TSUTSUMI & ASSOCIATES AUSTIN TSUTSUMI & ASSOCS INC WOOD & TAIT INC
-

Source EDR Digital Archive

### MANONO ST 1992

- 457 HILOHOOGANHJI
- KUKI, SOHKO
- 500 MARUO, KATSU
- 519 BARTMAN, A
- 533 MASSMAN, SHELLY TAMAMOTO, HAJIME
- 542 HIRAM, M
- 557 MURAKAMI, S
- 573 FIGUEROA, LAUREN A
- 576 TANABE, ANTHONY J



Cross Street

-

Source EDR Digital Archive

#### PIILANI ST 1992

456	PETTI, B	
-----	----------	--

- 525 HAWAIIAN SUN PRODUCTS INC
- 638 ESSENTIAL CONCEPTS
- 640 CELLULAR HAWAII
- ITSUS FISHING SUPPLIES INC
- 648 ISEMOTO CONTRACTING CO LTD
- 760 OLAA STEAKHOUSE
- 810 HIRANO, MITSURU
- 820 TAKETA PATRICK Y SRA

Target Street

-

Cross Street ✓ Source EDR Digital Archive

### MANONO ST 1987

457 HILOHOOGANHJI



Cross Street

-

Source EDR Digital Archive

#### PIILANI ST 1987

- 638 DAHLBERG J REALTY LTD
  DAIRY QUEEN BIG ISLAND LTD
  640 ITSUS FISHING SUPPLIES INC
- J J S DISCOUNTS UNLIMITED
- 648 ISEMOTO CONTRACTING CO LTD\*



Cross Street

-

Source EDR Digital Archive

#### PIILANI ST 1982

- 638 HILO FIRE EXTINGUISHERS
- 640 ARLETTES PACKAGING
- 648 ALPHA EQUIPMENT INC ISEMOTO CONTRACTING CO LTD\*

5207731.5 Page: A15

Target Street

Cross Street ✓ Source EDR Digital Archive

### MANONO ST 1977

300 BLAIR LTD\*

454 ITSUS FISHING SUPPLIES INC

-



Cross Street

-

Source EDR Digital Archive

#### PIILANI ST 1977

- 638 HILO FIRE EXTINGUISHERS
- 640 ARLETTES PACKAGING
- 648 ALPHA EQUIPMENT INC
- 760 OLAA STEAK HOUSE INC

## DRAFT ENVIRONMENTAL ASSESSMENT

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

**Appendix B Storm Water Pollution Prevention Plan** 

# STORM WATER POLLUTION PREVENTION PLAN FOR THE CONSTRUCTION OF

# 1893 Beverage Company & Kanaka Cafe

TMK (3) 2-2-033: 011

Prepared by:

Engineering Partners, Inc.

P.O. Box 4159

455-B E. Lanikaula Street

Hilo, Hawaii 96720

January 2023

# Table of Contents

Executive Summary	1
Storm Water Team	1-2
Nature of Construction Activities	2
Emergency Related Projects	3
Identification of Other Site Contractors	3
Sequence and Estimated Dates of Construction Activities	4-5
Site Map	6-8
Construction Site Pollutants	9
Sources of Non-Storm Water	10
Buffer Documentation	10
Description of Storm Water Control Measures	10-11
Pollution Prevention Procedures	11
Procedures for Inspection, Maintenance, and Corrective	
Action	11
Staff Training	12
Documentation of Compliance with Safe Drinking Water	
Act Underground Injection Control (UIC) Requirements	10
	1 Z
Inspection Report Form	13-15

#### EXECUTIVE SUMMARY

The construction project "1893 Beverage Company & Kanaka Cafe" will include a beverage bottling plant and the Kanaka Café in Hilo, Hawai'i. This Storm Water Pollution Prevention Plan, herein after referred to as SWPPP, describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. These procedures are specific to preventing pollution spread by storm water passing through the project site. This SWPPP has been developed according to Hawaii Administrative Rules, Chapter 11-55 with specific reference to Section 7 of Appendix C. The application of the procedures described herein will prevent pollutants from spreading beyond the project site by way of storm water runoff.

#### STORM WATER TEAM (HAR Chapter 11-55, Appendix C, Section 7.2.1)

The persons described below as part of this project's Storm Water Team are responsible for the development, modification, and implementation of the SWPPP.

#### Mr. Yen Wen Fang, P.E.

Mr. Fang is the Civil Engineer of Record and is responsible for the initial draft(s) of the SWPPP and any revisions necessary to obtain approval from the Department of Health – Clean Water Branch.

#### General Contractor

Responsibilities: 1. Install and maintain storm water runoff controls and Best Management Practices (BMP's) through the duration of the construction.

- 2. Conduct weekly inspections of the site to check storm water runoff control measures and BMP's to detect violations of and conditions which may cause violations.
- 3. Take immediate corrective action to repair, modify or replace any storm water control; clean up and properly dispose of spills and releases; remedy a permit violation.
- 4. Notify the Construction Project Manager of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.

Contact info to be provided at least 30 days prior to construction Name: Telephone: Email:

#### Construction Project Manager

Responsibilities: 1. Oversee construction of the project and provide construction management services.

- 2. Submit additional information/documents necessary to complete the NPDES permit to the Owner.
- 3. Submit information/documents for compliance with the NPDES permit conditions to the Owner.
- 4. Conduct periodic site inspections for compliance with permit conditions. Check storm water runoff control measures and best management practices (BMPs) to detect violations of and conditions which may cause violations.
- 5. Recommend modification of the SWPPP to the Owner. Recommendations shall be based on site observations and input by other storm water team members.
- 6. Maintain records of any modifications to the SWPPP including monthly reports.
- Ensure members of the storm water team are aware of changes to the SWPPP and ensure changes are implemented by the General Contractor at the construction site.
- 8. Immediately notify the Owner of any violations, and corrective actions taken with regard to the storm water controls, BMPs, the Permit and the SWPPP.
- 9. Notify the Owner of situations or occurrences which may impact use or operation of the facility or its employees and users.

#### Contact info to be provided at least 30 days prior to construction

Name: Telephone: Email:

### NATURE OF CONSTRUCTION ACTIVITIES (HAR Chapter 11-55, Appendix C, 7.2.2)

The parcel area is approximately 2.57 acres. Of the overall project area, approximately 2.52 acres will be disturbed by the proposed construction activities. Construction activities will include Beverage Factory construction, Kanaka Café construction, AC paving, loading dock construction, landscaping, concrete walkways/pavement, possible retaining wall construction, drainage improvements utility installation and site grading. The area expected to be disturbed at any one time should be no greater than 2.52 acres. Construction areas, including support areas such as stockpiles, and storage, will be confined to the project site.

#### EMERGENCY RELATED PROJECTS (HAR Chapter 11-55, Appendix C, Section 7.2.3)

This is not an emergency project.

#### IDENTIFICATION OF OTHER SITE CONTRACTORS (HAR Chapter 11-55, Appendix C, Section 7.2.4)

At this time, the contractors and subcontractors for this project have not been determined. Upon their determination, and at least 30 prior to the start of construction, a revised SWPPP identifying all site contractors will be submitted.

(General Contractor Company Name) TBD					
(General Contractor Contact Person Name) TBD					
(General Contractor Mailing Address) TBD					
(General Contractor Mailing City) TBD (GC Mailing State and Zip Code) TBD					
(General Contractor Telephone Number) TBD					
(General Contractor Email Address) TBD					

(Sub-Contractor #1 Company Name, as needed) TBD					
(Sub-Contractor Contact Person Name) TBD					
(Sub-Contractor Mailing Address) TBD					
(Sub-Contractor Mailing City) TBD (Sub Mailing State and Zip Code) TBD					
(Sub-Contractor Telephone Number) TBD					
(Sub-Contractor Email Address) TBD					

(Sub-Contractor #1 Company Name, as needed) TBD					
(Sub-Contractor Contact Person Name) TBD					
(Sub-Contractor Mailing Address) TBD					
(Sub-Contractor Mailing City) TBD (Sub Mailing State and Zip Code) TBD					
(Sub-Contractor Telephone Number) TBD					
(Sub-Contractor Email Address) TBD					

### SEQUENCE AND ESTIMATED DATES OF CONSTRUCTION ACTIVITIES (HAR Chapter 11-55, Appendix C, Section 7.2.5)

The general sequence of construction activities and activity durations is provided in chronological order below:

#### Install Perimeter BMPs

The installation of perimeter BMPs will take approximately one week. Biosocks/silt fences will be placed along the perimeter of the site prior to the start of any other construction work. These Biosocks/silt fences will remain in place throughout the duration of the project to act as filters for storm water entering and exiting the project site. Interior BMPs will be installed as applicable based on the progress of the project.

#### Interior BMPs

Interior BMPs will be installed as applicable based on the progress of the project. For example, impermeable concrete truck washout basins will be utilized but these will not be necessary until concrete work begins.

#### Rough Grading

Rough grading operations will take approximately four weeks. Rough grading includes the excavation and embankment within the project site prior to any structural improvements. The initial stockpile/ storage area(s) will be created during this phase and sediment trapping wattles will be installed to surround their perimeter.

#### Retaining Walls (if needed)

Retaining walls would be constructed throughout the site. Concrete truck washout basins will be installed prior to any concrete trucks arriving onsite for the construction of the retaining walls.

#### **Underground Utilities**

Installation of underground utilities will take approximately 6 weeks. Underground piping for electrical, sewer, water, and other utilities will be installed in this phase.

#### **Building Erection**

Building erection will take approximately eight weeks. This phase of work include the installation of the building framing and exterior finish. There are no additional BMPs

required to be installed with this phase of work but the stockpile/storage area(s) may need to be modified.

#### Final Site Grading and Paving

Final site grading and paving will take approximately four weeks. This phase includes bringing the site up to final grades and the installation of Portland cement concrete pavement.

#### Site Finish Work and Landscaping

Site finish work and landscaping will take approximately four weeks. This phase includes the installation of planting, painting, and other minor finishing work required to complete the project.

#### **Removal of Temporary BMPs**

Removal of temporary will take approximately one week. However, this task may not begin until this are of the project has been accepted as complete by the owner and a maintenance period has elapsed, allowing all finishes to be cured and planting to be established.

# Site Map

Hawaii Administrative Rules Chapter 11-55, Appendix C, Section 7.2.6



18/2023 10:59 am 10 PB/DETES 3031 PB/DEFTES 17360-31-01 1803 BEV&KANAKA CAL





MANUFACTURER AS A PACKAGE (I.E. FABRIC ATTACHED TO POST) THE MANUFACTURER'S

METAL, MUST BE CAPABLE OF SUPPORTING

#### <u>CONSTRUCTION SITE POLLUTANTS</u> (HAR Chapter 11-55, Appendix C, Section 7.2.7)

The following activities may result in pollutants being transported by storm water runoff:

#### Rough and Final Grading

Rough and final grading are ground moving activities. These activities will leave bare earth or imported aggregates exposed to weather. These activities may result in sediment being transported by storm water, introducing additional turbidity to receiving waters. Sediment trapping wattles will be installed to intercept storm water runoff as it enters and exits the project site. These wattles will filter the runoff, preventing sediment from being released from the project site.

#### Concrete Pours

Portland cement and other concrete constituents are pollutants which may affect turbidity and pH. These pollutants may be released while concrete is still in its plastic stage. Once the concrete has reached its initial set, there is no longer potential for these pollutants to be released. Concrete pours will be conducted in dry weather and covered if rain should come after the pour has started. Concrete truck washout will be directed to an impermeable basin where water will be allowed to evaporate and the remaining sludge will be disposed of offsite. Additionally, the sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.

#### AC Pavement

AC paving operations potentially allow for the release of oils. Paving will be scheduled for sunny days to allow for maximum cure time prior to rainfall contacting the new pavement. Additionally, the sediment trapping wattles installed around the perimeter of the site will act as filters if any concrete is contained in the storm water runoff.

#### Fertilization for Landscaping

Fertilizers typically contain high levels of nitrogen, phosphorous, and potassium. These chemicals may result in algal blooms or other unwanted vegetative growth if they are released. Sediment trapping wattles installed around the perimeter of the site will act as filters if any of these nutrients are contained in the storm water runoff.

#### SOURCES OF NON-STORM WATER (HAR Chapter 11-55, Appendix C, Section 7.2.8)

Wash water will be directed into an impermeable basin where the water will be allowed to evaporate and the remaining sludge will be transported to the local landfill. If it is necessary to spray water for dust control, that water will be minimized to ensure no runoff is generated. There are no other sources of non-storm water anticipated during construction.

#### BUFFER DOCUMENTATION (HAR Chapter 11-55, Appendix C, Section 7.2.9)

There is no State water within 50 feet of the project's earth disturbances.

#### DESCRIPTION OF STORM WATER CONTROL MEASURES (HAR Chapter 11-55, Appendix C, Section 7.2.10)

The storm water control measures proposed for use on this project are described below.

#### Silt Fence

Sediment barrier composed of permeable geotextile filter fabric attached to support posts will be installed at the perimeter of the project site prior to any ground disturbing activities. Sil fence intercepts the flow of sediment laden runoff, which filters the water and traps the sediment.

#### Sediment Trapping Wattles (Biosock)

Mulch filled sediment trapping wattles (wattles) will be installed to surround the stockpiles and storage areas as well as to surround drywell and catch basin inlets.

#### Stabilized Construction Entrance/Exit

Stabilized construction entrance/exit shall be installed at the beginning of the project to access construction site from paved roads. Shall be a minimum of 12" thick and 3" to 6" aggregate free of fines. This stabilized construction entrance/exit will reduce the amount of sediment tracked off-site by construction vehicles.

#### **Compaction**

Fill materials will be compacted as they are installed. This activity is intended to prevent future settlement as traffic loads are placed upon the fill, but has the added benefit of making these areas less susceptible to erosion.

#### **Vegetation**

Areas of the project site that do not receive pavement (including gravel pavement) will be vegetated after applying topsoil. This activity stabilizes the soil and also provides beautification of the area.

#### POLLUTION PREVENTION PROCEDURES (HAR Chapter 11-55, Appendix C, Section 7.2.11)

The following practices and procedures will be implemented during construction to prevent pollutants from leaving the project site.

#### Vehicle Maintenance

Unless it is an emergency situation, no vehicle maintenance or repairs will occur onsite. Vehicles with observed leaks will be removed from the site. No soaps, solvents, or detergents will be used for cleaning of construction equipment. When not in use, construction equipment and vehicles will be kept offsite or stored in a specific area contained by sediment trapping wattles.

#### Waste Transport

Wastes generated during construction will be loaded into covered dump trucks for transportation offsite. Where those wastes are reusable or recyclable, such as excavated rock material, they will be transported to the contractor's baseyard for storage and processing. Where the wastes generated are not reusable or recyclable, they will be transported to the local landfill.

### PROCEDURES FOR INSPECTION, MAINTENANCE, AND CORRECTIVE ACTION (HAR Chapter 11-55, Appendix C, Section 7.2.12)

The General Contractor will perform one weekly inspections of the BMPs to ensure they are in place and functioning properly. If any deficiencies are observed at that time, they will be corrected prior to his leaving the jobsite. If a significant rainstorm occurs, whether during a workday or not, the General Contractor will inspect the BMPs immediately following the rain event and make any necessary corrections. See example inspection report at end of SWPPP and inspection reports shall be kept at site or at an easily accessible location, so that it can be made available at the time of an onsite inspection.

If at any time the General Contractor observes that the BMPs are not functioning as they were intended, he will consult with Mr. Fang to determine the appropriate corrective measures and immediately implement them upon making that determination.

### STAFF TRAINING (HAR Chapter 11-55, Appendix C, Section 7.2.13)

Prior to commencement of earth-disturbing activities or pollutant-generating activities, whichever occurs first, the General Contractor must ensure that the following personnel understand the requirements of this permit and their specific responsibilities with respect to those requirements:

- 1. Personnel who are responsible for the design, installation, maintenance, and/or repair of storm water control (including pollution prevention measures).
- 2. Personnel responsible for the application and storage of chemicals.
- 3. Personnel who are responsible for conducting the required inspections.
- 4. Personnel who are responsible for taking corrective actions as required.

The General Contractor is not required to provide or document formal training for subcontractors or other outside service providers, but must ensure that such personnel understand any requirements of the permit that may be affected by the work they are subcontracted to perform. At a minimum, personnel must be trained to understand the following if related to the scope of their job duties (e.g. only personnel responsible for conducting inspections need to understand how to conduct inspections):

- 1. The location of all storm water control on the site required by this Permit, and how they are to be maintained.
- 2. The proper procedures to follow with respect to the Permit's pollution prevention requirements.
- 3. When and how to conduct inspections, record applicable findings, and take corrective measures.

## DOCUMENTATION OF COMPLIANCE WITH SAFE DRINKING WATER ACT UNDERGROUND INJECTION CONTROL (UIC) REQUIREMENTS FOR CERTAIN SUBSURFACE STORM WATER CONTROLS (HAR Chapter 11-55, Appendix C, Section 7.2.14)

If using any of the following storm water controls at the site, as described below, the permittee must document any contact with the Department of Health's Safe Drinking Water Branch (SDWB) for implementing the requirements for underground injection wells in the Safe Drinking Water Act.

- 1. Infiltration trenches (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system.
- 2. Commercially manufactured precast or pre-built proprietary subsurface detention vaults, chambers, or other devices designed to capture and infiltrate storm water flow.
- 3. Drywells, seepage pits, or improved sinkholes (if storm water is directed to any bored, drilled, driven shaft or dug hole that is deeper than its widest surface dimension, or has subsurface fluid distribution system).

#### **INSPECTION REPORT FORM**

Date:	Project/Site:	Permit No.:
Inspector's Name:		Weather:

Site Specific Construction Best Management Practices (SSCBMPs) Plan	Yes	No	N/A	Date Corrected	Notes
Is a copy of the NPDES & SWPPP plan available at the site?					
Is the SWPPP plan current and up-to-date?					
Are all permit conditions available at the site?					
Are inspection records available at the site?					
Site Conditions	Yes	No	N/A		Notes and Corrective Actions
Are off-site flows entering the construction site?					
Is there evidence of polluted discharges off the site?					
Is there evidence of polluted discharges from the site?					
Is repair, maintenance, or installation of sediment control BMPs needed at the site?					
Is repair, maintenance, or installation of erosion control BMPs needed at the site?					
Are construction materials/debris/trash/soil stored or disposed of properly at the site?					
Is there vehicle tracking from the site to receiving streets?					
Do locations exist where additional or revised BMPs are needed?					
Do locations exist where BMPs may no longer be necessary and may be removed?					
Does your site evaluation indicate a need to update or revise the current SWPPP plan and/or accompanying drawings?					

Best Management Practices	Location	Installed Per Specifications (Y/N)	Adequate	Needs Maintenance	N/A	Date Corrected	Notes
Controlling Storm Water Flowing or	nto and through	the Project					
Soil Stabilization							
Slope Protection	I		ſ				
Storm Drain Inlet Protection					-		
Perimeter Controls and Sediment B	arriers						
Sediment Basins and Detention Por	nds					[	
Stabilized Ingress/Egress Structures	; 		Γ		[		
Additional Erosion and Sediment Co	ontrol BMPs				1		

Best Management Practices	Location	Installed per Specifications	Adequate	Needs Maintenance	N/A	Date Corrected	Notes
		(Y/N)					
Material Handling and Waste Mana	agement						
Baseyards/Staging Areas	•					•	
Washout Areas		·		·	•		
Proper Equipment/Vehicle Fueling	and Maintenanc	e Practices					
Additional Non-Erosion or Sedimer	nt Control BMPs	•		•			·
Post Construction BMPs							

Photos taken during the SWPPP inspection documented above are:

Attached

Inserted

□ Not taken, attached, or inserted.

I certify that I am the person who performed the inspection documented above and that all information recorded on this form is a true and accurate representation of what was observed at the construction site recorded above. Any photographs attached that were taken during the inspection are a true, accurate, and unaltered representation of what was observed during the inspection documented above.

Inspector's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## DRAFT ENVIRONMENTAL ASSESSMENT

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

Appendix C Archaeological Inventory Survey

1481-051718

#### INTERNAL DRAFT

#### ARCHAEOLOGICAL INVENTORY SURVEY

#### TMK: (3) 2-2-033:011



#### WAIĀKEA AHUPUA'A

#### SOUTH HILO DISTRICT

ISLAND OF HAWAI'I

# HAUN & ASSOCIATES

Archaeological, Cultural, and Historical Resource Management Services 73-4161 Kaao Road, Kailua-Kona HI 96740 Phone: 808-325-2402 Fax: 808-325-1520

#### EXHIBIT C

#### 1481-051718

# INTERNAL DRAFT **ARCHAEOLOGICAL INVENTORY SURVEY** TMK: (3) 2-2-033:011 WAIĀKEA AHUPUA'A SOUTH HILO DISTRICT ISLAND OF HAWAI'I

1

Prepared by:

Alan E. Haun, Ph.D. and Dave Henry, B.S.

Prepared for:

COLUMBUS East, LLC 2571 Lemon Road, Honolulu, HI 96815

May 2018

#### AUN ES <u>SS(</u>

ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL RESOURCE MANAGEMENT SERVICES 73-4161 Kaao Road, Kailua-Kona HI 96740 PHONE: 808-325-2402 FAX: 808-325-1520

#### MANAGEMENT SUMMARY

Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK: (3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i. The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules.

The survey identified one site in the project area consisting of a concrete slab interpreted as an historic foundation or walkway (Site 50-10-35-1481 2xxx<sup>1</sup>). The site is assessed as significant solely for its information content. The site has yielded information important for understanding historic activity in the area. The mapping, written descriptions and photography of Site 1481.2 adequately document it and no further work or preservation is recommended.

Four displaced isolated objects were also identified during the project. These consist of a metal gear (Isolated Object 1), a concrete post (Isolated Object 2), and two concrete platforms (Isolated Object 3 and 4). The displaced gear and the concrete post are probably associated with the historic use of the project area; however, the two concrete platforms were brought to the project area in the 1990s and were used to support cooling towers.

The proposed project consists of the construction of a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 1481.2 will potentially be impacted during future development. This activity will have no effect on historic properties because Site 1481.2 requires no further work or preservation.

Cover photo: Vegetation in eastern portion of project area (view to south)

HAUN & ASSOCIATES | ii

<sup>&</sup>lt;sup>1</sup> All sites listed on the State Inventory of Historic Places (SIHP). Site numbers are 5 digit sequential numbers by island : 50 = State of Hawai'i, 10= Island of Hawai'i, 35= Hilo quadrangle, <u>488.22xxx</u>=Site number

#### Contents

MANAGEMENT SUMMARY	ii
INTRODUCTION	1
Scope of Work	1
Project Area Description	1
Methods	6
ARCHAEOLOGICAL AND HISTORICAL BACKGROUND	8
Historical Documentary Research	8
Previous Archaeological Research	
Project expectations	
CONSULTATION	
FINDINGS	20
CONCLUSION	
Discussion	
Significance Assessments	
Treatment Recommendations	
TRANSLATION OF HAWAIIAN WORDS	
REFERENCES	

### Figures

Figure 1 Portion of 1995 7.5' Hilo quadrangle showing project area parcels	2
Figure 2. Tay Man Key 2-2-033 showing project area	3
Figure 2. Franking Roy 2.2. 000 showing project area	4
Figure 5. Froposed development winning project and a first Google Farth)	5
Figure 4. January 21, 2013 Aerial view of project area (initial dougle call initial dougle call)	7
Figure 5. Vegetation in western portion of the project area (view to east)	/
Figure 6. Modern debris within project area	/
Figure 7. Portion of Lyon's 1882 Register Map No. 892 showing approximate locations of project area	12
Figure 8. Mid-20th Century map of Hilo	14
Figure 9. January 16, 1965 aerial photograph of project area	16
Figure 10. Previous archaeological work	18
Figure 11 Stellocation map	21
Figure 12. Site 14812 plan map and photographs	22 <sub>.</sub>
Figure 13. Test Pit 2 profile and photograph	23
Figure 14. Isolated object 1; metal gear (view to east)	24
Figure 15. Isolated object 1; metal gear (view to northwest)	24
Figure 16. Isolated object 2; concrete post (view to northeast)	25
Figure 17. Isolated object 2; concrete post (view to south)	25
Figure 18 Isolated Objects 3 and 4 an map and photographs	26

HAUN & ASSOCIATES | iii

### Figures (cont.)

Figure 10. Test Dit 1 profile and photograph	28
Figure 15. Test Fit 1 prome and photograph	20
Figure 20. Metal rod and copper disk from Test Pit 1	29
The state of the second second response disk from Tost Pit 1	29
Figure 21. Metal rod and copper disk norm restrict	

#### Tables

Table 1. Land commission Awards in Waiākea Ahupua'a	9
Table 2. Previous archaeological work in Waiākea	. 17

#### INTRODUCTION

At the request of Ms. Fumiyo Okuda of COLUMBUS East, LLC, Haun & Associates conducted an archaeological inventory survey (AIS) of the 2.57 acre TMK:(3) 2-2-033:011 located in Waiākea Ahupua'a, South Hilo District, Island of Hawai'l (Figure 1 and Figure 2). The objective of the AIS is to satisfy current historic preservation regulatory review inventory requirements of the Department of Land and Natural Resources-State Historic Preservation Division (DLNR-SHPD), as contained within Hawai'i Administrative Rules, Title 13, DLNR, Subtitle 13, Chapters 276 and 284, State Historic Preservation Rules (DLNR 2003).

The developer, COLUMBUS East, LLC plans to construct a warehouse and adjacent office building with associated infrastructure within the southern portion of the project area (Figure 3). There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. One archaeological site was identified during the project consisting of an historic concrete slab (Site 14812). This site was recommended for no further work. The site is located outside the area of proposed development but may potentially be impacted during future development. This AIS is prepared in conjunction with a Special Management Area (SMA) permit application for the County of Hawai'i Planning Department.

The survey fieldwork was conducted between April 13 and April 18, 2018 by Haun & Associates Project Supervisor Solomon Kailihiwa, M.S and a crew of four archaeologists under the direction of Dr. Alan Haun. Approximately 16 person days of labor were required to complete the fieldwork portion of the project. Described in this final report are the project scope of work, field methods, background information, survey findings, and significance assessments of the sites with recommended treatments.

#### Scope of Work

Based on DLNR-SHPD rules for inventory surveys the following specific tasks were determined to constitute an appropriate scope of work for the project:

- Conduct background review and research of existing archaeological and historical documentary literature relating to the project area and its immediate vicinity--including examination of Land Commission Awards, *ahupua'a* records, historic maps, archival materials, archaeological reports, and other historical sources;
- 2. Conduct a high intensity, 100% pedestrian survey coverage of the project area;
- 3. Conduct detailed recording of all potentially significant sites including scale plan drawings, written descriptions, and photographs, as appropriate;
- Conduct limited subsurface testing (manual excavation) at selected sites to determine feature function;
- 5. Analyze background research and field data; and
- 6. Prepare and submit Final Report.

#### **Project Area Description**

The project area is a rectangular shaped 2.57 acre parcel located in Waiākea Ahupua'a between approximately 15 to 20 ft elevation. All elevations presented in this report are in feet above mean sea level (AMSL). The parcel is bordered to the south by Piilani Street and by vacant land to the north, west and east. The proposed extension of Mililani Street will extend along the west side of the parcel and the proposed Wehilani Street will extend along the north side (see **Figure 3**). **Figure 4** is an aerial view of the project area vicinity taken on January 21, 2013. The Waiākea Fish Pond is located to the west of the project area.

HAUN & ASSOCIATES | 1

TMK:(3)2-2-033:011

Report No.1481-051718



Figure 1. Portion of 1995 7.5' Hilo quadrangle showing project area parcels

HAUN & ASSOCIATES | 2

T M K:(3)2-2-033:011



HAUN & ASSOCIATES | 3

7



TMK:(3)2-2-033:011

Report No.1481-051728

i

ł

.1

1 .....

HAUN & ASSOCIATES | 4


Figure 4. January 21, 2013 Aerial view of project area (from Google Earth)

#### TMK:(3)2-2-033:011

The vegetation in the project area consists of bingabing (*Macaranga mappa*), tropical ash (*Fraxinus uhdei*) and banyan (*Ficus benghalensis*) trees, areca palms (*Areca catechu*), and various grasses and vines. The eastern half of the parcel is comprised of dense grass and trees that have been taken over by vines (see cover photo of this report). The western portion has a high canopy of trees with little grass (**Figure 5**). There is modern trash scattered throughout the parcel indicating the area has served as an informal dump for local residents (**Figure 6**).

The terrain throughout the project area is relatively level soil. The soil is Keaukaha extremely rocky muck on 6-20% slopes (rKFD). This soil consists of a surface layer of dark brown muck (8") over pahoehoe bedrock (Sato et al. 1973:27). The Keaukaha soil has rock outcrops over 25% of the surface, has a rapid permeability, a medium runoff and a slight erosion hazard. It also is primarily in native forest with cleared areas suitable for pasture. The underlying lava was deposited 750 to 1,500 years ago from Mauna Loa Volcano (Wolfe and Morris 2001:11 and Sheet 2).

Annual rainfall in the vicinity of the project area ranges from 3,550 to 4,400 mm (140 to 173 inches; Giambelluca et al. 2013). The mean average temperature in this general area is approximately 73.8 degrees F (usclimatedata.com). There are no surface water sources present in the project area. The project area is located approximately 600 meters inland from the shoreline at Hilo Bay and the mouth of the Wailea River (see Figure 1).

#### Methods

Archival research was conducted at the Hamilton Library Hawai'i and Pacific Collection at the University of Hawai'i at Manoa, the University of Hawai'i at Hilo Hawaiian Collection, the Land Survey Office and the Archives Division of the Hawai'i Department of Accounting and General Services, the Bishop Museum Archives, the State Historic Preservation Division library in Hilo, the State Survey Division, and the Hawai'i State Public Libraries in Honolulu and Hilo.

The field work portion of the project consisted of a 100% surface examination of the parcel with the surveyors walking transects at 10-meter intervals. Ground surface visibility throughout the parcel was fair to excellent. The features identified during the survey were flagged with pink and blue flagging tape and their locations were determined with the aid of a Garmin Global Positioning System (GPS) Model 60-series device using the North American Datum (NAD) 1983 datum. The accuracy of the GPS device for a single point is +/- 3-5 m. This accuracy was increased to approximately 2-3 meters by taking multiple points including property corners and overlying the plotted points on a scaled map using AutoCAD software.

The boundary for the sites documented during the project was defined based on proximity and probable age. Features that are likely of similar age (prehistoric, historic) and are less than 15 meters apart are considered to be one site. The sites in the project area were documented by preparing scaled plan maps, completing standardized site and feature forms, and photographic documentation.

A total of 2.0 sq meters of excavation was conducted during the project. Test Pit 1 was situated in the southern portion of the project area and Test Pit 2 was located adjacent to the Site 1481.2 concrete slab. The test pits were excavated in arbitrary levels within stratigraphic layers. Test Pit 1 was terminated on the bedrock substrate and Test Pit 2 was terminated in a culturally sterile deposit. The soil removed during excavation was screened through ¼ inch mesh hardware cloth. Following the excavation, a section drawing depicting the stratigraphy was prepared and post-excavation photographs were taken. The test pits were described using standard terminology, referencing USDA Soil Survey descriptions and Munsell Soil and Rock color notations. Texture and inclusion content were also noted. Cultural material recovered during the excavations was placed in paper bags labeled with the appropriate provenience information and transported to Haun & Associated laboratory for analysis.



Figure 5. Vegetation in western portion of the project area (view to east)



Figure 6. Modern debris within project area

# ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

# Historical Documentary Research

The project area is situated in the *ahupua'a* of Waiākea in South Hilo District. The *ahupua'a* is one of the largest in the district covering over 95,000 acres. The *ahupua'a* extends along the coast from the west side of Hilo Bay to the Puna District boundary and inland to approximately 6,000 ft elevation. Much of the following is summarized from *Hilo Bay: A Chronological History* (Kelly et al. 1981), an extensive and thorough compendium of historical information about Hilo including Waiākea.

Hawaiian traditional and legendary accounts attest to the longstanding importance of Waiākea. The chief of the Hilo region, Kulukulu'a, who resided in Waiākea, was the first conquest of 'Umi-a-Liloa in his campaign to unify the districts of Hawai'i Island. Hilo with its large bay, fishponds, wet taro fields, and abundant freshwater was a population center for commoners and royalty. Kamehameha I and his court resided in Hilo in the 1890s. In preparation for his planned invasion of Kauai in 1802, Kamehameha built a canoe fleet at Hilo, reportedly consisting of 800 vessels.

In 1824, a missionary station was established in Waiākea. Soon after, churches and schools were established. Whalers began stopping at Hilo in the mid-1820s. In the 1830s, a sawmill was búilt, and two stores were opened. By the end of the decade, a sugar cane plantation and mill were established on Ponahawai lands. By 1857, there were three sugar cane mills in the Hilo area. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Early historic accounts also document the importance of Hilo. In 1823, Ellis estimated the population to be 2,000 people in 400 houses. Ellis described the extensive use of *lauhala* thatch in house construction in Hilo. He described the land as intensively cultivated with plantains, bananas, sugar cane, taro, potatoes, melons, coconuts and breadfruit. Wet taro was grown in marshland mounds (*kipi*). Hilo was a center for trade among the people of Ka'u, Hamakua, and Hilo. Between the 1790s and 1820s, sandalwood was cut and brought to Hilo for export. *Pulu* from tree ferns and *pia* (arrowroot) were also exported. Ellis also describes coastal fishing.

In the 1840s, political acts of the Hawaiian Kingdom government would change the land tenure system in Hawai'i. All lands were segregated into one of three categories: "Crown Lands" owned by the occupant of the throne, "Government Lands" controlled by the state, and "Konohiki Lands" controlled by the chiefs; and "were all subject to the rights of native tenants" (Chinen 1958:29, Beamer<sup>1</sup> 2014:143). In 1846, King Kamehameha III appointed a Board of Commissioners commonly known as the Land Commissioners, to "confirm or reject all claims to land arising previously to the 10<sup>th</sup> day of December, AD 1845." Notices were frequently posted in *The Polynesian* (Moffat and Kirkpatrick, 1995); however, the legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Kirkpatrick 1995:48-49) and the act is known today as *The Great Māhele*. In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speakman 2001:91). The Kuleana Act of 1850 allowed for fee simple land ownership by commoners.

The Waihona 'Aina (2000) Māhele Database; which is a compilation of data from the Indices of Awards (Indices 1929), Native Register (NR n.d.), Native Testimony (NT n.d.), Foreign Register (FR n.d.) and Foreign Testimony (FT n.d.) provides information on the Land Commission Awards (LCA) during the Māhele The Waihona 'Aina database (2000) lists 51 parcels claimed by 37 claimants within Waiākea in the mid-1800s (**Table 1**). All claims are for parcels

		_			_	_	_		_																															2
	Comment												Claimant was District 1 school supervisor									Unclear which section	awarded								entere C belacent					Awarded entine III	Awarded 3 parcel in Kenau	•		
	Acreage	4.46	3.6	0/N	۵/N		D.6	2.25	ũ	2.98	0	10.25	12.25	0	ر ۲	1.3	3.75	۵	0	4.25	1.22				1.01	1.03	1.05	0.24	13.14								•	0	1.02	•
	Glver	Konohiki Pea	Parents	D/N	U/D	D/N	Kapuaakuni	Kulana	Kalana	Konhiki Pea	Kaunuohua	Кашиоћиа	Pea	Konohiki	Kahue	parents	Kaiaria	a/N	Kamahiai	pairents	parents				Makaimo	Makaino	Kuahopu	Konohiki Pea								Kamehamhea I	Kamahlai	Barenaba	mother	father
	bare Rec <sup>i</sup> d			d/N	a/n	U/N	1847	1840	1841	1843	1847	1847	1841	1847	1844	Kam. 1 thme	1844	Q/N	1847	Kam. 1 time.	Kam. 1 time				Kam. 1 time	1839	1834	1841								d/N	1847	1843	1845	1846
Boundary	West	Kainea	Kalua	q/N	d/N	d/N	Kaihenui's house	Kahue	Kahue	road beside river	waste land	waste land	stone wall/gov't land	lli Alencho	kanohlki	lli Kealou 2	kanahiki	main road	konohikì	lii Kialoa/Kaiholena		Keaonui	Kukalholo	Kupelea	kanohiki	konohiki	lli Kaapea	lli Hanahalau		Katua	Kaihenui	Q/N	Kaiamo	lfi Alenoho	Kaihenuí	۵/N	konohiki	Jdle land	Kauhi	idle land
Roundary	south	Kainea	Konohlki's waste land	0/N	D/N	d/N	Kekuanaoa	Kaluahino	Kalana Stream	Mihaeleiki	waste land	waste land	ili Koloa	UI Kalili	Kahue	konofilki	konahiki	konotriki	kanahlki	konohiki		Samuela	ili Waiuli	kanohiki	Mcealoha	вагапара	konohiki	Nakai		Niihau	Kaihe	a/n	Kauhi	Samuela	Samuela	0/N	kanahiki	idle land	fishpand	0/N
Boundary	East	Mikaeleiki	Kamanuftaku	Q/N	Q/N	d/N	ocean	Kahauai	Manu	Pouaki's field	oad to Volcano	new road	lli Kołca	III Koleanuí	konahiki	lli Kinaauauwai	konahiki	stream	konahiki	i Haanaauauwai 1st		Barenaba	Samuela	Pahulu	gov't road	Alanui	ili Kuahua	lli Kialoa		Kaihenui	Kaaiana	Kane	konohiki	idle land	idie land	0/N	kanohiki	idle land	Levi	d/N
Risering Contraction	North	Konohiki's waste land .	Kautu	D/N	a/v	0/N	konohíki	Waiiani	Kukuau	IIi Ohelo	waste land	Kaapa	IIİ Alencha	Kauhopu	Kukuau Ahupua'a	konohiki	Keaniho	Aiko	konahiki	kenohiki		Barenaba	Barenaba	Ili Walenoho	gov't land	Kaiana	fishpond	konohtki		Kolea	Kekuaaoa's garden	Nihau	Kane	idle land	. Kahalelalu	d/N	konohiki	idle land	Kuahopu	idle land
	Land Use	cultivated	cultivated, partly fenced	d/N	house lot	cultivated	planting plot	cultivated field	cultivated field	cultivated with 6 houses	house lot with 2 houses, grave	house lot	partly enclosed with S houses	breadfruit tress, sweet potatoes, coffee	2 kihapais; hala grove	house lot with 4 houses; breatruit and kukui trees	d/N	2 cultivated fields	uncultivated	4 kihapal; two houses		house tot with 3 houses	cultivated field	uncultivated with one house	cultivated with house	3 field & 1 house	3 wet taro plots & 2 houses	2 cultivated fields		4 cultivated kihapai & 2 houses	1 cultivated klhapaj	1 kihapai taro mounds	6 taro mounds	uncultivated	2 cultivated fields	U/N	2 cultivated kihapai, road through lot	pasture, cultivated plot, 2 houses	. 3 fields	cultivated
	10 B	Кеаме Кари	d/N	d/N	Alenoho	Kolea	Kolea	Alenoho	Alenoho	Kamakola	Puainako	Alenoho	Kalihi	Koleaiki	0/N	Kialca 1	N/D	Atenoha	0/N	Hinaauauwai or Mahina auwai 5	kolea				Katonoho	Katonoho	Kanahana	Puahua	Pioplo							Piopio	Kalulunui	Ohualoto	Piopio	Paaloa
	Section				-																	1	2	m	-					1	71	e	4	5	9					
in the second	awanded	I	1	0	0	0	1	1	0	1	0	1	1	0	1	1	1	0	0	1		L			1	1		1	2				-			1	0	Q,		•
and a second	daimed.	۲	1	1	1	1	1	1	1	1	-1	1	1	1	1	1		г	1	1			m		1	1	7	1			,	۵				٦	1	1		-
	Claimant	Mahoe	Kapu	Kalhenul	Kaheananui	Haae (John Tavior)	S. Kolona Halai	Kolalo	Kaheananui	1. Kahuhikaua	Kapuaakuni	John B. Kaiana	Barenaba	Samuela	Keoniho	Napeahi	Kahue	Peke	Hewahewa	Hale			Kuaio		Wahine	Moealoha	Nakal	Keawe		~		Nuanupu				Kamanulu	Hewahewa	Kane	Kamanohaka	Kilioe
	LCA	1E	15	1198	2108	1106	1279	1333	1335	1738	2274	2281	2327	2338	2402	2603	2663	3872	3996B	4004			4344		4737B	4737	4785	5018			l	/стс				7713	6081	8802	8803	8811

1 | |

Table 1. Land commission Awards in Waiākea Ahupua'a 🥈

.

HAUN & ASSOCIATES | 9

T M K : (3)2-2-033:011

Report No. 1481-051748

1 1 1

### T M K : (3)2 - 2 - 033:011

Table 1. Land Commission Awards in Waiākea Ahupua'a (cont.)

۱

Report No.1481-051218

ŗ

										_							_
Contract									Unclear which parcel awarded				Awarded 2 apana				
Acreage	3.4					0	Q.8					6.9	5.19			2.5	7
Giver	parents					N/D	Wahinenohoi hilo					d/N	Kapapa			Maalo	Maalo
Date Recid	Karn. Il time		_			0/N	a/N		-			Kalaìopuu time	1843			1834	1834
Boundary (		Kauhi	cart road	Kuahopu	Niihau	d/N		Manokaka	Apua	Аиа	lli Piapio	Levi		konahiki	Barenaba	gov't road	Alanui Aupuni
Boundary		fishpond	Kaehunui	Hojeaniu	konahiki	0/N		Kaniahiai	Kaniahialio	Kaniahial	lishpond	fishpond		Barenaba	cart road	konahiki	Barenaba
Boundary East		Kamanonaha	konohiki	Kauhi	Kuahope	d/N		Nuihao	Nuihao	Nuilae	kanohiki	konohiki		sea	konohiki	Beakey	road
Boundary		Kaulu	kenahiki	Киаћори	Heienuí	D/N		Kona	Apua	Aua	Apua	Kamaheli		Halai	Kualiaupu	Kealiko	Wahinealua
asti brati (		house lot	cultivated	<ul> <li>3 cultivated fields</li> </ul>	1 cultivated field	formerly cultivated		uncultivated	partly cultivated	partly cultivated	uncultivated	3 fleids & house		house	1 cultivated field & 1 house	D/N	U/D
	Pianio					Pulu	Paiaahu 1 & 2					Paeaahu	Kolea			Alenoho	Alenoho
Section		1	2	m	4				5	m	4			H	2		
Apana Amardod		<u> </u>	-		-	-		J			1	1		, ,	4	-	1
Apana	4					-	4				•				4	1	-
Claimant		Kalua				Kapaakiha	Levi					Laholhilo		Kaihanui		Wahinealua	Kealiko
1CA.			8854			8868			9982			10004		110508		11173	11174

situated along the coast and immediately inland along the lower reaches of the Wailoa River less than 0.5 mi inland. No land commission awards are present within the project area.

Twenty-six parcels were awarded to 24 claimants. Chiefess Kamamulu was awarded the entire *ili* of Pi'opi'o under Land Commission Award (LCA) No. 7713. The remaining claims are for *kuleana* parcels ranging from 0.24 to 13.14 acres in area with an average of 3.6 acres. All, except five claims, were for single parcels. The testimonies for several awarded *kuleana* include claims for parcels that were not awarded.

The claim testimonies refer to 18 *ili* land divisions. Five *ili*; Kalonoho, Alenoho, Kolea, Pi'opi'o and Paeaahu; are mentioned two or more times and apparently were linear strips of land extending inland from the coast. *lli* Kalonoho was situated next to the western *ahupua'a* boundary with Kukuau. Alenoho was the next *ili* to the east followed by Kolea, Pi'opi'o and Paeaahu. The latter two *ili* bordered the west bank of Wailoa River and Fishpond. Six *ili* for LCAs on the east side of the river, from the river mouth inland, consist of Kamakola, Keawe Kapu, Kialoa, Hinaauauwai, Puahua, and Kanahana. Kalihi was situated inland between Alenoho and Kolea. The geographic location of the remaining *ili* cannot be determined because they are mentioned in testimony for claims that were not awarded.

Land use described in the LCA claim testimony included agriculture, pasture, burial, and residence. Thirty-four houses are mentioned and LCA 2274 also describes the presence of a grave. Most of the claim testimony mentions cultivated fields. Crops include wet taro, sweet potatoes, breadfruit, coffee, and *kukui*. A *hala* (*Pandanus* spp.) grove and fishponds are also mentioned.

By 1857, there were three sugar cane mills in the Hilo area. Large tracts of land were put in cane cultivation and sugar cane was also grown by individuals around their houses. A sugar mill was established in Waiākea at the inland end of Waiākea Fishpond in the late 1870s. A railroad transport system was constructed for the Waiākea Mill between 1879 and 1880. Figure 7 s a portions of Lyon's 1882 Register Map No. 892 obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). This map shows the Waiākea Mill, located to the southwest of the project area, a wharf and the extent of an 1881 lava flow from Mauna Loa that threatened Hilo.

Between the 1860s and 1880s there were two wharf facilities on the west side of Waiākea Point, one on the Wailoa River, and on the west side of the bay at the foot of Waianuenue Street . By 1880, 1,400 acres of sugar cane were in cultivation and by the end of the decade over 5,600 acres were cultivated. In the 1900s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments.

Between 1900 and the 1930s, the population of Hilo grew dramatically with the expansion of sugar cane cultivation, pineapple production, timber industry and other commercial developments. In the 1910s, the Hilo Railroad Company expanded the rail system to Puna and Hilo Town. A railroad wharf was built north of the mouth of the Wailoa River. Between 1909 and 1913, the railroad was extended to the North Hilo and Hamakua Districts.

The opening of the Panama Canal and anticipated increase in trans-Pacific shipping lead to serious efforts to build a breakwater to protect shipping in Hilo Bay. Construction of the breakwater began in 1908. The breakwater was initially planned for a location just east of Coconut Island, but the plan was modified and the selected site was approximately 6,000 ft east of the island. The initial plans called for a 10,000-ft long breakwater along Blonde Reef. Stone for the structure was brought by railroad from quarries in Puna and Waiākea. The breakwater was completed in 1929.



Figure 7. Portion of Lyon's 1882 Register Map No. 892 showing approximate locations of project area

0 22  $^{\circ}$ .**‡**.> 81-0540418

#### T M K: (3)2-2-033:011

By the 1910s, the existing railroad and government wharf facilities were inadequate to support shipping. In 1912, the Territorial Government contracted the construction of a new wharf approximately one mile east of Coconut Island and dredging of the adjacent portion of the bay. The new wharf, designated Kuhio Wharf, was completed in 1916. From the beginning, the wharf was congested and plans for a second wharf were made. Construction of the wharf began in 1921 and it was completed in 1923. A third wharf was completed in 1927.

In 1932 a Canec manufacturing plant was constructed along Waiākea Pond, located between the Waiākea Mill site and the project area. Canec was the brand name for a fiber board made from bagasse, the byproduct of sugarcane. **Figure 8** is a mid-20<sup>th</sup> Century map of the Hilo area prepared by the Work Projects Administration (WPA) showing the location of the Canec plant and the project area, obtained from the Archives Division of the Hawai'i Department of Accounting and General Services (http://ags.hawaii.gov/survey/map-search). The map also shows the railroad line extending past the project area to the west.

The following description of the Canec plant is provided by Peter Young as follows:

Between 1879 and 1948, Waiākea Mill Company conducted mill operations at Waiākea Pond. Bagasse – a by-product of sugarcane – became a secondary industry, first as a fuel for the milis' boilers, then as the main ingredient for a wallboard product.

As commercial fuel oils became increasingly available in the late 1920s, the use of bagasse as a fuel declined. This byproduct of production was then creatively used to manufacture a wallboard product for construction.

In 1929, Hawaiian Cellulose Ltd, a subsidiary of the Waiākea Mill Company applied for a patent for the manufacture of it. (County of Hawai'i)

On May 23, 1930, "The leading plantation agencies and a group of business men organize a \$2,250,000 corporation for the manufacture of wallboard and other universally used bagasse fiber products. The name chosen was the Hawaiian Cane Products, Limited." (The Friend, June 1930)

Later that year, the directors of the company "authorized the purchase of a one-hundred-ton daily capacity plant for the manufacture of insulating board from bagasse." (The Friend, October, 1930) (It ended up costing \$2.5-million.)

April 27, 1932, the company's Hilo plant (at Waiākea, adjoining Wailoa Pond) was opened; the company emphasized "the overseas distribution for which the industry aims." (The Friend, June 1, 1932) (By 1934, "five carloads were shipped ... to Manchuria." (Friend, July 1, 1934))

Canec was originally the brand name for pressed fiber board made by Hawaiian Cane Products, Ltd., but it has become commonly used to refer to all pressed board of this type.

It was formed into sheets similar in size to drywall, as well as other sizes for use as ceiling and wallboard. Canec was used for interior ceilings and walls in many residential and commercial structures throughout the state of Hawai'i. (DOH)

Reportedly, Charles William Mason, a Scotsman who ended up in Ola'a on the Island of Hawai'i in 1919, was the inventor of Canec. Mason became the superintendent of Hawaiian Cane Products Company, Ltd., located in Hilo near the site of the Waiākea Mill Company. (Johnston)

The use of Canec as a building material in Hawai'i gradually expanded during the 1930s, but greatly accelerated after World War II when construction volume rapidly increased.



3)2-2-033:011

ΤMX

Report No. 1481-051718

Figure 8. Mid-20th Century map of Hilo

It was estimated that from the twelve plantations contributing bagasse to the canec plant, one million tons of bagasse would be available for the production of wallboard.

Hawaiian Cane Products was sold to the Flintkote Company in 1948. That year, the Hilo plant manufactured 120,000,000-square feet of canec panels; from 1945 to 1955; the majority of the housing in the Islands featured cane walls and/or ceilings. (HHF) Some suggest the canec plant was destroyed by the May 23, 1960 tsunami that devastated Hilo; actually, a fire destroyed the canec plant a month earlier (April 3, 1960.)

In 1971, the hotel complex known now as Waiākea Villas was built on the canec plant site (the adjacent Waiākea plant millpond was made part of Wailoa River State Park. (Young 2016 – imagesofolfhawaii.com)

Several devastating tsunamis have impacted the coastal Hilo area in the immediate vicinity of the project area. In 1877, a 16-ft high tsunami struck the coast of Waiākea destroying all houses within 100 yards of the shore along with a wharf, storehouse, a quarantine hospital on Coconut Island and a bridge. On April 1, 1946, a 7.1 magnitude earthquake occurred in the Aleutian Islands, generating a 50 ft high tsunami that struck Hilo, killing 159 people. (Hawaiimagazine.com)

Smaller tsunamis struck the area in 1952 and 1957, causing little damage to the Hilo area. Unfortunately, because of this many coastal Hilo residents refused to evacuate on May 23, 1960, when an 8.3 magnitude earthquake in Chile triggered a series of waves that struck the area (*ibid*.). Many that did leave returned when the first of the waves measured only 3 feet in height; however, subsequent waves would grow to a maximum height of 35 feet, resulting in the death of 61 people. Due to the devastation of the 1946 and 1960 tsunamis, much of Hilo's bayfront was not rebuilt and is now comprised of grassy park areas.

Figure 9 is an aerial photograph of the area taken in January 16, 1965 obtained from the University of Hawai'i at Manoa online library (http://magis.manoa.hawaii.edu). This photograph shows a large structure present within the project area. According to Suisan Company's property manager Mr. Harvey Taira, the properties manager for the Suisan Company has owned the property since the 1990s. He said that the parcel formerly contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not used. Both of these structures were removed in the early 1990s. Potential remnants of this facility were identified during the present project, discussed in the Findings section of this report.

The northern portion of the project comprising approximately 23,000 sq feet (0.52 acres) was formerly designated as TMK: (3) 2-2-033:012 (see Figure 2) owned by the Hawaii Electric Light Company (HELCO) under Grant 13431. This areas was subsequently added to the adjacent Parcel 11, which was owned by Ruddle Sales and Service Company under Grant 11489 (see Figure 2 and Figure 3).

In summary, historical documentary research indicates that the shoreline along Hilo Bay was intensively settled and cultivated. In the early 1800s, missionaries established a station at Hilo because of its large population, abundant freshwater and cultivation potential. Soon churches and schools were established. Whalers stopped at Hilo because of the protected anchorage and availability of freshwater and provisions. Sugar cane cultivation, cattle ranching, and trade rapidly changed the traditional subsistence economy during the early to mid-1800s. By the late 1800s, vast areas were producing sugar cane and large scale timber harvesting was underway. Transportation infrastructure included a railroad system and wharf facilities. The area underwent a dramatic increase in population as people came to the area to work for the plantations and other commercial enterprises. Despite the destructive effects of the multiple tsunamis that have impacted the area, Hilo continues to thrive as the largest community on the eastern coast of Hawai'i Island, due in large part to the resilience of the Hilo residents.



Figure 9. January 16, 1965 aerial photograph of project area

#### Previous Archaeological Research

A search of the DLNR-SHPD archaeological report database and other sources identified 29 archaeological projects in Waiākea; however, no previous archaeological work has been conducted in the project area. Figure 10 shows the project locations and Table 2 summarizes the projects. Not included in the figure or table are the studies by Stokes (Stokes and Dye 1991), which focused on major sites, primarily *heiau* throughout Hawai'i Island, a survey of east Hawai'i by Hudson (1932), the fishpond study of Kikuchi (1973), and the general, primarily archival, studies of McEldowney (1979) and Moniz (n.d.). None of the previous studies included the current project area. Stokes (Stokes and Dye 1991), relying in part on the earlier observations of Thrum, listed six *heiau* for the Hilo area; however, all were destroyed at the time of Stokes fieldwork in 1906. Ohele Heiau, a *luakini* temple, was reported for Waiākea.

The surveys in **Table 2** cover 1,800 acres of Waiākea between sea level and 5,100 ft elevation. The only traditional Hawaiian sites identified in the vicinity of the project area are an agricultural pit, the Puna Trail, and five *ahu* reported by Hammatt and Bush (2000), a sinkhole containing a human burial identified by Bush et al. (2000), and a terraced depression and associated low wall identified by Haun and Henry (2001). Hammatt and Bush attribute the absence of traditional sites to the massive ground disturbance of sugar cane cultivation and commercial and residential development of the Hilo area. Historic remains identified by the surveys consist of 38 sites with 357 features. Nearly all of the identified features are the result of stone clearing for sugar cane cultivation.

Author	Study Type*	Elevation (Ft AMSL)	Arreage	Historic Use	No of sites	No ci Feas	Traditional Features	Historic Features
Kam (1983)	Archival research	0-5	1	None	1	1	Heiau	-
Haun and Henry (2000)	Inventory survey	0-15	20	Port	1	4	-	4
Walker and Rosendahl (1996)	Field inspection	0-460	130	Sugar cane/ developed	5	5	-	1
Haun and Henry (2001)	Inventory survey	35-40	65	Ranching/Air Field	4	5	Terraced depression and wall	3
Devereux, Borthwick, Hammatt and Orr (1997); Hammatt and Bush (2000); Wheeler, Bautista, Wilkinson and Hammatt (2014)	Reconnaissance, Inventory survey	40-80	504	Military	4	8	Pit, 5 <i>chu,</i> and Puna Trail	3
Haun and Henry (2008)	Assessment	59-78	4.0	Sugar cane	0	-	•	-
McGerty and Spear (1999)	Inventory survey	70	3	Sugar cane	1	13	-	13
Maly, Walker and Rosendahl (1994); Spear (1995)	Inventory survey, Data recovery	70-80	5	Sugar cane	4	51		51
Kennedy and Ireland (1994)	Reconnaissance	70-80	8	?	0		-	-
Carson (1999)	Inventory survey	98-131	176	?	0		-	-
Haun and Henry (2016)	Assessment	100-105	5	Flood control	0	-	-	-
Borthwick and Hammatt (1993)	Inventory survey	120-140	11	Sugar cane	-	4		4
Rechtman and Henry (1998)	Inventory survey	120-205	40	Sugar cane	1	117	•	117
Borthwick, Collins, Folk and Hammatt (1993)	Inventory Survey	140-330	163	Sugar cane	4	47	-	47
Haun and Henry (2007)	Assessment	151-183	1.4	Sugar cane	0	-		-
Hunt (1992); Hunt and McDermott (1993); Robins and Spear (1996); Elbe,Denham and Pantaleo (1997); Spear (1998); McGerty and Spear (1999); Dega (2000)	Reconnaissance, Inventory survey, Excavation	200-1500	· 106	Sugar cane	11	88	•	88
Robins, Fortinii and Spear (1996)	Inventory survey	200-1500	264	Sugar cane	3	18	-	18
Rosendahl (1994)	Field inspection	250-290	11	?	1	1		-
Escoit (2004)	Inventory survey	300-380	258	Sugar cane	6	80	-	80
Bush, McDermott and Hammatt (2000); McDermott and Hammatt (2001)	inventory survey	300-360	20	Sugar cane	1	1	Sinkhole w/burial	-
Rechtman (2001)	Inventory survey	5000-5100	5	Ranching	0	-	-	
		state Total e	1800		42	366		357

Table 2. Previous archaeological work in Waiākea





### TMK:(3)2-2-033:011

# Report No. 1481-0510 18

McEldowney (1979) lists 53 traditional Hawaiian sites for Waiākea and 31 historic sites, primarily buildings. Most of the traditional sites were located by Hudson (1932) and Kikuchi (1973). The remaining six were identified during the Statewide Inventory Survey Nearly all were situated along the coast. The sites include 17 fishponds, seven burials, six platforms, five enclosures, three *heiau* including one previously identified by Stokes, three house foundations, three trail segments, two shrines, several miscellaneous features, and two complexes of platforms, enclosures, and terraces.

McEldowney used the limited site inventory and historic documentary evidence to develop a land use and settlement pattern model for the Hilo area. The model consists of five elevationally-defined zones: Coastal Settlement, Upland Agricultural, Lower Forest, Rainforest, and Sub-Alpine or Montane. The Coastal Settlement Zone extended approximately 0.5 miles inland from the shoreline between sea level and 50 ft elevation. The zone was the most densely populated with both permanent and temporary habitations, high status chiefly residences, and *heiau*. Settlements were concentrated at Hilo Bay and sheltered bays and coves. Also present were fishponds and gardens where breadfruit, coconut, *kukui*, banana, *wauke*, sugar cane, sweet potato, and wet and dryland taro were cultivated. The ocean provided fish and other marine resources.

The Upland Agricultural Zone was situated between approximately 50 ft and 1,500 ft elevation. Settlement in the zone consisted of scattered residences among economically beneficial trees and agricultural plots of dryland taro and bananas. Lava tubes were utilized for shelter. A pattern of shifting cultivation is believed to have converted the original forest cover to parkland of grass and scattered groves of trees. Wetland cultivation of taro occurred along streams.

The Lower Forest Zone ranged from 1,500 ft to 2,500 ft elevation. Timber and other forest resources such as medicinal plants, *olona*, and birds were gathered from the zone. Site types consisted of temporary habitations, trials, shrines, and minor agricultural features in forest clearings and along streams. Sites in the Rainforest Zone (2,500-5,000 ft elevation) and Subalpine or Montane Zone (5,000-9,000 ft) were limited to trails and associated temporary habitations. These zones were used for intra-island travel and gathering of valued resources including hardwoods, birds, and stone for tool making.

### **Project expectations**

Based on previous archaeological research and historical documentary evidence, the project area is located in the McEldowney's densely populated Coastal Settlement Zone. The prehistoric use of this area may include permanent and temporary habitations, high status chiefly residences, and *heiau*. Due to the parcel within Hilo town proper and its proximity to the Waiākea Mill, historic structures may also be present.

# CONSULTATION

The project area is currently owned by the Suisan Company. The project client, COLUMBUS East, LLC is a developer who proposes to construct a warehouse and an office building on the property (see Figure 3). Consultation regarding the subject parcel was conducted by Dr. Alan Haun with Mr. Harvey Taira, the properties manager for Suisan Company on May 15, 2018. According to Mr. Taira, the project area was purchased by the Suisan Company in the early 1990s. Prior to the acquisition the property contained a warehouse used for receiving fresh produce, and a dilapidated Quonset hut that was not in use. This warehouse is depicted in Figure 9. Soon after the Suisan Company purchased the land, the warehouse and Quonset hut were buildozed.

Mr. Taira was shown photographs of two concrete platforms identified during the project, designated as isolated Objects 3 and 4 (see Figure 18). According to Mri Taira, these platforms which were used as cooling tower supports for a cold storage facility elsewhere and were brought to the property by the Suisan Company on a forklift in the 1990s.

### FINDINGS

The archaeological inventory survey identified one archaeological site and four displaced isolated objects in the project area. The site consists of a concrete slab (Site 1481.2). The isolated objects consist of a large metal gear and axle (Isolated Object 1), a displaced concrete post (Isolated Object 2) and two concrete platforms (Isolated Objects 3 and 4). The location of the site and isolated objects is presented in Figure 11.

Site 14812 is a formed concrete slab located in the northwestern portion of the project area. The slab is rectilinear in shape and is 32 feet, 9 inches (10.05 meters) long (west-northwest by east-southeast) and 6 feet, 1 inch (1.86 meters) wide. The southwestern corner of the slab is broken, with the remaining sides ranging in height from 0 to 6.25 inches (0.16 meters). A plan map and photographs of the site are presented in Figure 12.

The central and portions of the west end of the slab are covered in a thick root mat, with the remainder comprised of exposed concrete. The root from a tropical ash tree extends across the western side of the slab. An Areca palm and several bingabing trees are growing on or adjacent to the slab. Modern debris is scattered around the site.

A 1.0 by 1.0 meter test pit (Test Pit 2) was excavated adjacent to the Site 1481.2 slab (see Figure 12). This excavation revealed two deposits (Figure 13). Layer I consists of 0.3 to 0.36 meters of black (10YR 2/1) silty clay with 60% cobble and pebble inclusions with no cultural material. Layer II consists of 0.9 to 1.09 meters of boulder, cobble and pebble fill material with no cultural material:

Site 1481/2 is interpreted as an historic foundation or walkway based on its formal type and appearance. The site's integrity is altered and is in fair to good condition. The site is recommended for no further work as the mapping, written description and photography has adequately documented it. It is assessed as significant per HAR §13-284-6 under Criterion d (information content).

As stated, four isolated objects were also identified during the AIS (see **Figure 11**). Isolated object 1 is a large metal gear with an attached axle located in the northern portion of the project area. The gear is 0.67 meters in diameter with 0.04 meter cogs along the perimeter. "SR188" and "20T" are imprinted on the exterior side of the gear. The axle is 1.73 meters long and 0.065 meters in diameter and extends through the center of the gear. There is a 0.11 meter diameter wide metal hub at the other end with remnants of broken metal around its perimeter. Scattered modern trash s present in the area. Overviews of the object area presented in Error! Reference source not found.

Isolated object 2 is a displaced formed concrete post lying on the ground in the southern portion of the project area. The post is 13 feet, 2 inches (4.06 meters) long, 9.75 inches (0.25 meters) wide and 7.75 inches (0.2 meters) thick with beveled edges. There is a rectangular concrete base at one end that is 34.5 inches (0.88 meters) long, 31.75 inches (0.81 meters) wide and 11.25 inches (0.28 meter) thick. There is a projection off the main post that is 0.78 meters long, with identical widths and thickness. The end of this projection is broken and metal rebar reinforcing is visible within the concrete. No cultural material was found in association with the post. Overviews of this post are presented in Figure 16 and Figure 17.

**Isolated Objects 3 and 4** consist of concrete platforms located in the north-central portion of the project area, 31.0 meters south of Site 1481/2. A plan map and photographs of these objects are presented in Figure 18.

**Isolated Object 3** is a collapsed concrete platform located at the western end of the site. It consist of a rectangular concrete pad that is 10 feet, 5 inches (3.2 meters) long (east-west) and 6 feet, 1 inch (1.88 meters) wide and 3.5 inches (0.09 meters) thick. The top of the pad is 13 inches to 15.5 inches (0.34 to 0.4 meters) in height above the surrounding ground surface.

#### ТМК:(3)2-2-033:011

Report No.1481-061348



Figure 11. Site location map





Figure 13. Test Pit 2 profile and photograph



Figure 14. Isolated object 1; metal gear (view to east)



Figure 15. Isolated object 1; metal gear (view to northwest)



Figure 16. Isolated object 2; concrete post (view to northeast)



Figure 17. Isolated object 2; concrete post (view to south)

ТМК: (3)2-2-033:011

Report No 1481-051718



HAUN & ASSOCIATES | 26

Figure 18. Isolated Objects 3 and 41an map and photographs

#### TMK:(3)2-2-033:011

There are two vertical formed concrete posts set on the ground at the western end of the pad. These posts are 10.5 inches (0.26 meters) square with beveled edges, and are 43.5 to 44 inches (1.1 to 1.12 meters) tall. The top of each post is broken. There is a displaced post lying on the surface of the pad. Modern trash is scattered around the feature.

**Isolated Object** 4 is located 13.4 meters to the east-southeast of Isolated Object 3. This platform is intact and consists of four vertical posts that support a concrete pad. The feature is rectangular in shape and is 10 feet, 1 inch (3.08 meters) long (northwest by southeast) and 5 feet (1.55 meters) wide. The surface of the platform is a formed concrete pad that is 17.5 inches (0.45 meters) thick. The posts are 10.5 inches (0.26 meters) square with beveled edges. The surface of the platform is 51 to 58.5 inches (1.3 to 1.49 meters) in height above the ground surface. The bottom of the concrete pad is 35.5 to 41 inches (0.9 to 1.04 meters) above the ground. Modern trash is also present in the area surrounding this feature.

As stated in the Consultation section, according to Mr. Taira, these platforms which were used as cooling tower supports for a cold storage facility elsewhere and were brought to the property by the Suisan Company on a forklift in the 1990s.

A 1.0 by 1.0 meter test pit (Test Pit 1) was excavated in the southern portion of the project area, 25.0 meters north of Piilani Street (see Figure 11). This excavation revealed similar deposits to that observed in Test Pit 1 (Figure 19). Layer I consists of 0.14 to 0.18 meters of black (10YR 2/1) silty clay with 55% cobble and pebble inclusions. An intact section of asphalt paving is present in the northeast corner of the test pit. Cultural material from Layer I consists of amber, light green and colorless bottle glass fragments, and a threaded metal bolt (2.5 inches long with 3/4" square head).

Layer II consists of 0.04 to 0.08 meters of dark reddish brown (5YR 3/4) cinder gravel fill with no cultural material. Layer III consists of 0.48 to 0.86 meters of boulder, cobble and pebble fill. There is a 0.31 meter thick remnant of a concrete block located along the western side of the test pit. Cultural material from Layer III consists of a 2.25 inch piece of wire and a metal rod with a copper disk at one end.

The metal rod is 9 inches long and 1/2 inch in diameter (Figure 20). The copper disk is 1.5 inches in diameter and has "Lunkenheimer" and "Fig. 2129" embossed on one side (Figure 21). Lunkenheimer was a manufacturing company established in 1862 that produced bronze and iron valves (http://www.lunkenheimercvc.com). It is likely that this object is a portion of a value designed to control the flow of water or other liquid.

The subsurface testing indicates that the project area has been modified by the introduction of fill material. Layer II and Layer III in Test Pit 1 and Layer II in Test Pit 2 are interpreted as imported fills based on their material composition and appearance. The presence of the surface sites in the project area, built on top of the Layer I soil deposit, suggest this soil was also an imported fill layer.



Figure 19. Test Pit 1 profile and photograph

TMK:(3)2-2-033:011

Report No.1481-051718



Figure 20. Metal rod and copper disk from Test Pit 1



Figure 21. Metal rod and copper disk from Test Pit 1

1

# CONCLUSION

### Discussion

The results of historical and archaeological background research indicates that a warehouse was formerly located in the project area (see Figure 9). This facility was subsequently removed in the early 1990s. The potential remnants of this facility, represented by a concrete slab, a metal gear and a concrete post remain in the project area.

The project area is located in close proximity to the Waiākea Fish Pond and it is probable that the area was once extensively used prehistorically. However, subsurface testing during the project indicates that the subject parcel was significantly impacted by the historic introduction of fill material. No evidence of the pre-contact use of the project area was observed during the archaeological inventory survey.

# Significance Assessments

The sites identified during the survey are assessed for significance based on Hawai'i Administrative Rules (HAR) §13-284-6. According to (HAR) §13-284-6 (b), a site must possess integrity of location, design, setting, materials, workmanship, feeling, and/or association and shall meet one or more of the following criteria:

- 1. **Criterion "a":** Be associated with events that have made an important contribution to the broad patterns of our history;
- 2. Criterion "b": Be associated with the lives of persons important in our past;
- 3. Criterion "c": Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- 4. **Criterion "d"**: Have yielded, or is likely to yield, information important for research on prehistory or history; and
- 5. Criterion "e": Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

The site in the project area possesses integrity of location, design, materials, and workmanship. It is assessed as significant under Criterion "d". The site has yielded information important for understanding the historic use of the project area.

# **Treatment Recommendations**

The mapping, written description and photography of the Site 1481.2 adequately document it and no further work or preservation is recommended. The developer plans to construct a warehouse and adjacent office building with associated infrastructure to be located in the southern portion of the project area. There are no immediate plans for the development of the remainder of the parcel. The proposed project will consist of mechanically grading the project area in advance of the construction activity. Site 14812 will likely be impacted during future development. This activity will have no effect on historic properties because Site 14812 requires no further work or preservation.

# TRANSLATION OF HAWAIIAN WORDS<sup>1</sup>

ahupua'a - traditional Hawaiian land unit usually extending from the uplands to the sea

hala - The pandanus or screw pine (Pandanus odoratissimus)

heiau - Pre-Christian place of worship, shrine

'ili - next in importance to ahupua'a and usually a subdivision of an ahupua'a

konohiki - headman of an ahupua'a land division under the chief

kukui - Candlenut tree (Aleurites moluccana), a large tree in the spurge family bearing nuts containing oily kernels

kuleana - small piece of property, as within an ahupua'a

Māhele - land division of 1848

mauka -inland

olona - A native shrub (Touchardia latifolia), with large, ovate, fine-toothed leaves

pahoehoe - Smooth, unbroken type of lava, contrasting with  $a'\bar{a}$  lava

pia - General name for starch; starch made from arrowroot is called pia Hawai'i to distinguish from other starches

Į.

pulu - soft, glossy, yellow wool on the base of tree fern leaf stalks (Cibotium spp.).

<sup>1</sup>- from wehewehe.org

## REFERENCES

Archives Division of the Hawai'i Department of Accounting and General Services.

2017 <u>http://ags.hawaii.gov/survey/map-search</u>

Beamer, Kamanamaikalani

2014 No Mākou Ka Mana Liberating a Nation. Kamehameha Publishing 2014, Honolulu, HI.

Borthwick, D., and H.H. Hammatt

1993 Supplemental Archaeological Survey and Testing of the Proposed University of Hawai'i at Hilo Expansion Area (TMK:2-4-01:10). Prepared for Engineering Concepts:

Borthwick D., J. Collins, W.H. Folk and H.H. Hammatt

1993 Archaeological Survey and Testing of Lands Proposed for Research and Technology Lots at the University of Hawai'i at Hilo (TMK:2-4-01:7 and 41). Prepared for Engineering Concepts.

Bush, A., M. McDermott, and H. Hammatt

- 2000 Archaeological Inventory Survey of an Approximately 20-Acre Parcel Proposed for the USDA Pacific Basin Agricultural Research Center located near the Intersection of Komohana and Puainako Streets, South Hilo, Hawai'i Island (TMK: 2-4-01:por. 122). Cultural Surveys Hawai'i, Inc Report prepared for SSFM International Inc.
- Carson, M.T.
- 1999 Archaeological Inventory Survey of the 176-acre Pana'ewa Campus Site, Waiākea Ahupua`a, Hilo District, Island of Hawai'i (TMK:2-1-13:154)

Chinen, Jon J.

1958 The Great Māhele: Hawaii's Land Division of 1848. Honolulu: University of Hawai'i Press.

DNLR (Department of Land and Natural Resources)

2003 Hawai'i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.

Dega, M.

2000 Addendum to: Archaeological Inventory Survey of the Puainako Street Realignment/Extension Project, Expanded Corridor, Waiākea, Kukua 1 and 2, South Hilo District, Hilo, Island of Hawai'i. Scientific Consultant Services, Inc. report Prepared for Okahara and Associates.

Devereux, T.K., D.F. Borthwick, H. Hammatt, and M. Orr

1997 Archaeological Reconnaissance Survey of Keaukaka Military Reservation, South Hilo District, Hawai'i Island, Cultural Surveys Hawai'i.

Eble, F.J., T. Denham, and J. Pantaleo

1997 Draft Report of Supplemental Archaeological Testing Conducted Along the Proposed Alternate Alignments of Puainako Street (TMK:2-4-01), Hilo, *Hawai'i*. On file at State Historic Preservation Division, Kapolei, Hawai'i. TMK:(3)2-2-033:011

Ellis, W.	
1963	Journal of William Ellis, Narrative of a Tour of Hawai'i, or OwhyeeHonolulu: Advertiser Publishing Company.
FR	
n.d.	Foreign Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawai'i State Archives.
FT	
n.d.	Foreign Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawaiʻi State Archives.
Giambelluc	a, T.W., Q. Chen, A.G. Frazier, J.P. Price, YL. Chen, PS. Chu, J.K. Eischeid, and D.M. Delparte
2013	Online Rainfall Atlas of Hawai'i. Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11- 00228.1.
Hammatt, H	I.H. and A.R. Bush
2000	Archaeological Inventory Survey of Selected Portions of the Hawai'i Army National Guard 503.6-acre Keaukaha Military Reservation, Waiākea Ahupua`a, South Hilo District, Hawai'i Island (TMK:2-1-12:3 and 2-1-13:10).
Haun and H	lenry
2000	Archaeological Inventory Survey, Hilo Harbor Facilities Expansion, TMK: 3-2-1-09: 2, 12, 41, 42 and TMK: 3-2-1-07: 20-37, Land of Waiākea, South Hilo District, Island of Hawai'i. Prepared by Haun & Associates for R.M. Towill Corporation.
2001	Archaeological Inventory Survey, Hilo International Airport Improvements, Land of Waiäkea, South Hilo District, Island of Hawai'i (TMK:2-1-12:por 9). Haun & Associates Report 015 prepared for Wilson Okamoto & Associates, Inc.
2002	Archaeological Inventory Survey, DHHL Project at Panaewa, Land of Waiākea, South Hilo District, Island of Hawai'i (TMK: (3) 2-2-47: 01). Haun & Associates Report 173 prepared for Mr. Brian Nishimura.
2003	Archaeological Inventory Survey, DHHL Project at Panaewa, Land of Waiākea, South Hilo District, Island of Hawai'i (TMK: 2-2-47:por 64), Haun & Associates Report 300 prepared for PBR Hawai'i.
2007	Archaeological Assessment, TMK: (3) 2-4-01: 116, Land of Waiākea, South Hilo District, Island of Hawai'i. Haun & Associates report 577 prepared for Mr. Sidney Fuke.
2008	Archaeological Assessment, TMK: (3) 2-2-30: Parcels 17 and 19 Land of Waiãkea, South Hilo District, Island of Hawai'i. Haun & Associates report 571 prepared for Hooluana Place LLC.
2018	Archaeological Inventory Survey, Waiākea Ahupua'a, South Hilo District, Island of Hawai'i (TMK: 2-1- 013:Por. 148), Haun & Associates Report 1102 prepared for PBR Hawai'i.
Hawaii Ma	gazine .
2018	hawaiimagazione.com

•

TMK:(3)2-2-033;011

Hudson, A.E.

1932 Archaeology of East Hawai'i. B.P. Bishop Museum Manuscript. Honolulu.

Hunt, T.L.

1992 Interim Report: Archaeological Inventory Survey Puainako Street, South Hilo District, Island of Hawai'i, Prepared for Okahara & Associates, Engineering Consultants, Ms. on file at State Historic Preservation<sup>1</sup>Division, Kapolei, Hawai'i.

Hunt, T.L., and M.J. McDermott

1993 Archaeological Inventory Survey, Puainako Street Extension Project, Lands of Waiākea, Kukuau 1 and 2, and Ponahawai, South Hilo District, Hawai'i. Prepared for Okahara & Associates, Hilo.

Indices

Images of Old Hawaii

2016 <u>imagesofolfhawaii.com</u>.

Kam, W.

1983 Letter Report: Unrecorded Heiau on State Lands, Waiākea, South Hilo, Hawai'i (TMK:2-1-07:11).

Kelly, M., B. Nakamura and D.B Barrere

1981 Hilo Bay: A Chronological History, Land and Water Use in the Hilo Bay Area, Island of Hawai'i. Prepared for U.S. Army Engineer District, Honolulu.

Kennedy, J. and S. Ireland

An Archaeological Survey for the Proposed Hilo Forestry Office Complex Extension located at TMK: 2-2-2701, in Waiākea Ahupua'a, South Hilo District, Island of Hawai'i, Archaeological Consultants of Hawai'i, Inc.

Kikuchi, W.K.

1973 Hawaiian Aquacultural Systems. Ph.D. Dissertation, University of Arizona.

Maly, K.

1996 Historical Documentary Research and Oral History Interviews: Waiākea Cane Lots (12, 13, 17, 18, 19, 20 & 20a). Prepared for UHH Hooikaika Club.

Maly, K., A.T. Walker and P.H. Rosendahl

1994Archaeological Inventory Survey, Waiākea Cane Lots, Portion of Parcel 6.Land of Waiākea, South HiloDistrict, Island of Hawai'i (TMK:2-4-57:01) PHRI Report 1370. Prepared for Roy Takemoto.

McDermott, M. and H. Hammatt

2001 Addendum to: Archaeological Inventory Survey of an Approximately 20-Acre Parcel Proposed for the USDA Pacific Basin Agricultural Research Center located near the Intersection of Komohana and Puainako Streets, South Hilo, Hawai'i Island (TMK: 2-4-01:por. 122). Cultural Surveys Hawai'i, Inc Report prepared for SSFM International Inc.

<sup>1929</sup> Indices of Awards Made by the Board of Land Commissioners to Quiet Land Titles in the Hawaiian

TMK: (3)2-2-033:011

McEldowney, H.

1979	Archaeological and Historical Literature Search and Research Design: Lava Flow Control Study, Hilo,
	Hawai'i. Prepared for the U.S. Army Engineer District, Honolulu prepared by the Department of
	Anthropology, B.P. Bishop Museum.

McGerty, L. and R.L. Spear

1999 An Inventory Survey of an Additional Unsurveyed Portion of TMK:2-4-57:1, Land of Waiākea, South Hilo District, Island of Hawai'i. Prepared for R.M. Towill Corp.

Moffat, R. M. and G.L. Kirkpatrick

1995 Surveying the Mähele: Mapping the Hawaiian Land Revolution. Palapala'āina. Honolulu: Editions Limited.

Moniz, J.J.

n.d. Historical and Archaeological Synthesis of Land Use and Settlement Patterns, Waiākea Ahupua'a, Hilo District.

NR

- n.d. Native Register of Kuleana Claims Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawai'i State Archives.
- NT
- n.d. Native Testimony Recorded by the Board of Commissioners to Quiet Land Titles in the Hawaiian Islands. Manuscript. Hawai'i State Archives.

Rechtman, R. and J.D. Henry

1998 University of Hawai'i-Hilo, Kawili Street Development, Archaeological Inventory Survey (TMK:3-2-4-01:5), Waiākea Ahupua'a, South Hilo District, Island of Hawai'i. PHRI Report 1877 prepared for Inaba Engineering, Inc.

Rechtman, R.

2001 Archaeological Inventory Survey and Limited Cultural Assessment for the Proposed Wastewater Treatment Facility at Kulani Correctional Facility (TMK: 3-2-4-08:9). Rechtman Consulting Report RC-0078 prepared for Ron Terry, Ph.D.

Robins, J., W. Fortini, and R. Spear

1996 An Archaeological Inventory Survey of the Proposed Mohouli Connector Road, Ahupua'a of Kukuau 1 and 2, Ponahawai and Punahoa, South Hilo District, Island of Hawai'i. Scientific Consultant Services of Hawai'i report 085-2 prepared for Youngki Hahn, Ph.D.

Robins, J.J., and R.L. Spear

1996

An Inventory Survey of the Puainako Street Realignment/Extension Project Expanded Corridor, Waiākeà, Kukuau 1-2, and Ponahawai, South Hilo District, Island of Hawai'i. Report prepared for Okahara and Associates.

#### TMK:(3)2-2-033:011

Rosendahl, P.H.

1994 Archaeological Field Inspection, Hale Nani Work Release Center, Land of Waiākea, South Hilo District, Island of Hawai'i. PHRI Letter Report 1516. Prepared for Belt Collins Hawai'i.

Sato, H.H., E.W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro Jr.

1973 Soil Survey of the Island of Hawaii. U.S. Dept. of Agriculture, Soil Conservation Service and University of Hawai'i Agricultural Experiment Station. Washington D.C. Government Printing Office.

Speakman, C.E., Jr.

1978 An Informal History of the Hawaiian Island. San Rafael: Pueo Press.

Spear, R.L.

- 1995 Data Recovery Excavations for Sites 50-10-35 19431, 19432, 19433 and 19434, Land of Waiākea, South Hilo District, Island of Hawai'i (TMK:2-4-57:01). Report prepared for Roy Takemoto.
- 1998 Letter Report concerning Archaeological Reconnaissance Survey of the Puainako Street Realignment/Extension Project Expanded Corridor, Waiākea, Kukuau 1 and 2 and Ponahawai, South Hilo District, Island of *Hawai* `i. Scientific Consultant Services Inc., Honolulu, Hawai`i.

Stokes, J. and T. Dye

1991 Heiau of the Island of Hawai'i. *Bishop Museum Bulletin in Anthropology* 2. Bishop Museum Press, Honolulu.

U.S. Climate Data website (<u>http://www.usclimatedata.com</u>)

University of Hawai'i at Manoa online library

2017 <u>http://magis.manoa.hawaii.edu</u>

Waihona 'Aina Corporation

1998 The Mahele Database, waihona.com.

Walker, A.T. and P.H. Rosendahl

1996 Archaeological Assessment Study, Hilo Judiciary Complex Project, South Hilo District, Island of Hawai'i. PHRI report 1721 prepared for State of Hawai'i, Dept. of Accounting and General Services.

Wehewehe.org

2016 Hawai'i Electronic Library - Nā Puke Wehewehe 'Ōlelo Hawai'i

Wheeler, M., O. Bautista, S. Wilkinson, and H. Hammatt

 Archaeological Inventory Survey and Monitoring Plan, Phase I, Keaukaha Military Reservation (KMR), Hawai'i Army National Guard Facility Waiākea Ahupua'a, South Hilo District, Island of Hawai'I, TMKs:
 [3] 2-1-012:003, 131 and [3] 2-1-013:010, Cultural Surveys Hawai'i report prepared for Hawai'i Army National Guard.

Wolfe, E., and J. Morris

2001 Geological Map of the Island of Hawai'i. U.S. Department of the Interior. U.S Geological Survey

# DRAFT ENVIRONMENTAL ASSESSMENT

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

Appendix D Traffic Impact Analysis Report

# FINAL

# Kanaka Beverage & Cafe Traffic Impact Analysis Report

TMK (3) 2-2-033:011

# Hilo, Hawaii

January 2023

Prepared for

Land Planning Hawaii LLC

Prepared by



# **Table of Contents**

I.		PRO	JECT DESCRIPTION 4 -
II.		EXIS	TING CONDITIONS
A	١.	G	eometric Configuration 7 -
E	3.	St	udy Intersections9 -
		1.	Hawaii Route 19 & Manono Street/Lihiwai Street9 -
		2.	Manono Street & Piilani Street9 -
		3.	Hawaii Route 11 & Piilani Street9 -
		4.	Manono Street & Kekuanaoa Street 13 -
		5.	Mililani Street & Kekuanaoa Street 13 -
C	2.	Ve	ehicle Volumes 13 -
		1.	24-Hour Volume 13 -
		2.	Intersection Peak Turning Movement Counts 14 -
		3.	Transit Facilities 15 -
		4.	Pedestrian and Bicycle Volumes 15 -
۵	).	E۶	xisting Automobile LOS 17 -
		1.	Methodology 17 -
		2.	Existing Intersection LOS Results 18 -
III.		FUT	URE WITHOUT PROJECT CONDITIONS 21 -
A	١.	U	pcoming Planned Projects 21 -
		1.	STIP 21 -
		2.	ERP (Previously OEQC) 21 -
		3.	Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii 23 -
E	3.	V	olumes 24 -
		1.	Background Growth 24 -
C	2.	Fu	uture Without Project LOS 29 -
		1.	Future (2027) Without Project Conditions 29 -
		2.	Future (2027) Without Project Mitigation 30 -
		3.	Future (2032) Without Project Conditions 30 -
		4.	Future (2032) Without Project Mitigation 31 -
		5.	Future (2042) Without Project Conditions 32 -
		6.	Future (2042) Without Project Mitigation 33 -

IV.	FUT	URE WITH PROJECT CONDITIONS	35 -
D	. Fu	uture With Project Generated Volumes	35 -
	1.	Project Related Volumes	35 -
E.	Fu	uture With Project Volumes	37 -
	1.	Future (2027) With Project Conditions	42 -
	2.	Future (2027) With Project Mitigation	43 -
	3.	Future (2032) With Project Conditions	43 -
	4.	Future (2032) With Project Mitigation	45 -
	5.	Future (2042) With Project Conditions	47 -
	6.	Future (2042) With Project Mitigation	49 -
V.	SUN	IMARY AND RECOMMENDATIONS	54 -
VI.	REF	ERENCES	56 -

# List of Figures

Figure 1: Project Location Map	5 -
Figure 2: Conceptual Site Plan	6 -
Figure 3: Study Intersections and HDOT Tube Count Stations	10 -
Figure 4: Existing Multimodal Facilities	11 -
Figure 5: Existing Intersection Lane Configurations	12 -
Figure 6: 24-Hour Volume Distribution on Manono Street between Kuawa Street and Piilani Street .	14 -
Figure 7: Existing (2022) Intersection Peak Hour Volumes	16 -
Figure 8: Vehicular Points (a) with a Median Refuge Lane vs (b) a Standard Intersection	20 -
Figure 9: Study Intersection Regional Traffic Volume Movements	25 -
Figure 10: Future (2027) Without Project Peak Hour Volumes	26 -
Figure 11: Future (2032) Without Project Peak Hour Volumes	27 -
Figure 12: Future (2042) Without Project Peak Hour Volumes	28 -
Figure 13: Kanaka Beverage & Cafe Project Related Trips	38 -
Figure 14: Future (2027) With Project Peak Hour Volumes	39 -
Figure 15: Future (2032) With Project Peak Hour Volumes	40 -
Figure 16: Future (2042) With Project Peak Hour Volumes	41 -
Figure 17: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2032 With Project)	46 -
Figure 18: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2042 With Project)	50 -
Figure 19: Conceptual Mini-Roundabout at Manono Street and Piilani Street	52 -
Figure 20: Mini Roundabout at Halekii Street and Mamao Street in Kealakekua	52 -
# **List of Tables**

Table 1: 24-Hour Volume on Manono Street between Kuawa Street and Piilani Street 13 -
Table 2: Peak Hour Pedestrian and Bicycle Volumes 15 -
Table 3: LOS Criteria for Unsignalized Intersections 17 -
Table 4: LOS Criteria for Signalized Intersections 17 -
Table 5: Existing (2022) LOS 19 -
Table 6: Island Naturals Complex Trip Generation 23 -
Table 7: Traffic Forecast - Daily Vehicles Trips in South Hilo 24 -
Table 8: Future (2027) Without Project Conditions 29 -
Table 9: Future (2032) Without Project Conditions 31 -
Table 10: Future (2042) Without Project Conditions 32 -
Table 11: Future (2042) Without Project Mitigation LOS Comparison at Manono Street and Kekuanaoa
Street 34 -
Table 12: Land Use Development Trip Generation Rates 35 -
Table 13: Pass-By-Rate (Trip Reduction) at Fast-Food Restaurant
Table 14: Project Related Development Phasing and Trips Generated
Table 15: HPMS 2018 Roadway Volumes 36 -
Table 16: Future (2027) With Project Conditions 42 -
Table 17: Future (2032) With Project Conditions 44 -
Table 18: Peak Hour Warrant Analysis for Future (2032) With Project Conditions at Manono Street and
Piilani Street 45 -
Table 19: Manono Street and Piilani Street Future (2032) With Project Peak Hour Volumes 47 -
Table 20: Manono Street and Piilani Street Future (2032) With Project Intersection Operations 47 -
Table 21: Future (2042) With Project Conditions 48 -
Table 22: Peak Hour Warrant Analysis for Future (2042) With Project Conditions at Manono Street and
Piilani Street 50 -
Table 23: Mini-Roundabout Benefits and Constraints (FHWA) 51 -
Table 24: Manono Street and Piilani Street Future (2042) With Project Intersection Operations 53 -

# **List of Appendices**

- Appendix A Traffic Count Data
- Appendix B Bus Routes and Maps
- Appendix C Analysis Reports Existing Conditions
- Appendix D Analysis Reports Future Without Project Conditions
- Appendix E Analysis Reports Future Without Project Mitigation
- Appendix F Analysis Reports Future With Project
- Appendix G Analysis Reports Future With Project Mitigation

# I. **PROJECT DESCRIPTION**

Hawaiian Kingdom Brands is proposing to construct an approximately 30,000 square-foot (sf) beverage bottling plant, 1,800 sf casual full-service restaurant with drive-through, and an 81-stall surface parkinglot in Hilo on the island of Hawaii. The proposed development, Kanaka Beverage & Cafe, is located at Tax Map Key (TMK) (3) 2-2-033:011, which is approximately 2.57-acres in size. The project location is on an undeveloped lot on the northeast (NE) corner of Piilani Street and Mililani Street (see Figure 1), adjacent to an undeveloped lot on the northwest (NW) corner of Piilani Street and Manono Street (TMK [3] 2-2-033:010). Mililani Street is undeveloped north of Piilani Street where the development is proposed. Property records show a roadway parcel north of the project site, but no road exists currently.

Construction of the development is anticipated to begin by early 2023, with completion expected by early 2024. The development is anticipated to generate trips from a mix of employees working at the beverage bottling plant or restaurant, customers for the sit-down restaurant and drive-through, and deliveries. It is anticipated that customers of the restaurant and drive-thru will access the site via a proposed entrance-only driveway on the north side of Piilani Street between Manono Street and Mililani Street. An exit-only driveway is proposed along an undeveloped roadway that will serve as a northern extension of Mililani Street. A third two-way driveway is also being proposed, at a location along the undeveloped roadway, which is expected to be used primarily by plant employees. Figure 2 shows the Conceptual Site Plan for the proposed development.

This traffic impact analysis report (TIAR) analyzed traffic operations and impacts for the AM and PM peak hours in alignment with County Code Section 25-2-46 Analysis was completed for Existing (2022) conditions, as well as for the Future Without Project, and Future With Project conditions for periods of five (5), ten (10), and twenty (20) years into the future corresponding to 2027, 2032, and 2042, respectively. Future analysis includes anticipated future traffic growth and trips resulting from surrounding area development for Without Project conditions while With Project conditions include trips resulting from the anticipated completion and operation of the proposed development by 2024.



Figure 1: Project Location Map



Figure 2: Conceptual Site Plan - 6 -

# II. EXISTING CONDITIONS

The Kanaka Beverage & Cafe development is proposed within the NE corner of Piilani Street and Mililani Street. The area to the NW is primarily forested/undeveloped and is surrounded by the Waiakea Pond. The area to the NE has numerous recreational facilities, sporting fields, and an auditorium. The area to the south largely consists of single-family residential homes although there are also numerous small office buildings, restaurants, and shops interspersed through the area. Hilo town is located approximately 1.25 miles NW of the development while Hilo International Airport (ITO) is located approximately 2.00 miles to the east of the development. The University of Hawaii at Hilo and Hawaii Community College are located south of the development, approximately 1.60 miles and 0.80 miles, respectively.

# A. Geometric Configuration

Hawaii Route 19 (also known as Kamehameha Avenue, Kalanianaole Street, Mamalahoa Highway and Hawaii Belt Road, but referred to as Hawaii Route 19 throughout this report for simplicity) is a State of Hawaii (State) owned roadway, extending from the Kuhio Wharf on Kuhio Street in the east (located in Hilo) to Lindsey Road in the west (located in Waimea), approximately 56-miles away. In the surrounding project area, Hawaii Route 19 is called Kamehameha Avenue and classified as a small urban principal arterial. In the study area, Hawaii Route 19 is a two-way, four-lane road travelling primarily in the eastwest direction. Paved sidewalks with curb and gutter exist along both sides of the roadway. Between the study limits of Manono Street and Hawaii Route 11, there are marked five-foot wide curbside bike lanes in each direction along Hawaii Route 19. Within the study area, parking is not permitted along Hawaii Route 19. The posted speed limit is 35 MPH in the study area.

Hawaii Route 11 (also known as Mamalahoa Highway, Hawaii Belt Road, Volcano Road, and Kanoelehua Avenue, but referred to as Hawaii Route 11 throughout this report for simplicity) is a State-owned roadway, starting at Hawaii Route 19 in the north (located in Hilo) and circumnavigating the island until its intersection with Hawaii Route 190/Palani Road (located in Kailua-Kona), approximately 122-miles away. In the surrounding project area, it is called Kanoelehua Avenue and classified as a small urban principal arterial travelling primarily in the north-south direction. In the study area, Hawaii Route 11, there are three travel lanes in the southbound (SB) direction between Hawaii Route 19 and Piilani Street, while there are only two travel lanes in the northbound (NB) direction. There are no dedicated bike facilities along this stretch of roadway. There is a six-foot-wide shoulder in the SB direction, and a tenfoot-wide shoulder in the NB direction. Paved sidewalks with curb and gutter exist along the west side of the roadway. Within the study area, parking is not permitted along Hawaii Route 11. The posted speed limit is 35 MPH in the study area.

Manono Street is a County of Hawaii (County) owned roadway, extending from Hawaii Route 19 in the north (located in Hilo) to Kawili Street in the south (located in Hilo), 0.70-miles away, at which points it continues as Kawili Street. In the surrounding project area, it is classified as a major collector. In the study area, Manono Street is a two-way, two-lane road travelling primarily in the north-south direction. Paved sidewalks with curb and gutter exist along both sides of the roadway between Piilani Street and Hawaii Route 19; however, neither are present south of Piilani Street until just before the Kekuanaoa Street

intersection. There are no dedicated bike facilities along this stretch of roadway. There are marked shoulders of varying widths (four to six feet) along both sides of the roadway between Piilani Street and Hawaii Route 19; however, these drop off south of the Piilani Street intersection. Within the study area, parking is not permitted along Manono Street. The posted speed limit is 35 MPH in the study area.

Piilani Street is a County owned roadway, extending from the Wailoa River State Recreation Area parking lot (located in Hilo) in the west to Hawaii Route 11 (located in Hilo) in the east. In the surrounding project area, it is classified as a residential roadway. In the study area, Piilani Street is a two-way, two-lane, road travelling primarily in the east-west direction. Paved sidewalks and curb and gutter are not present along Piilani Street. East of Manono Street, a minimal width paved shoulder is present along the south side of the roadway, while a larger eight-foot shoulder is present along the north side of the roadway. No shoulders are provided along Piilani Street west of the Manono Street intersection. There are no dedicated bike facilities along the corridor. Posted signs along the corridor indicate that a pedestrian with visual impairments may live adjacent to the corridor. Within the study area, parking is not permitted along Piilani Street. Numerous vehicles were observed parked perpendicular to the roadway, outside of the paved shoulder. There is no posted speed limit along the entirety of the corridor, representative of a default 25 MPH requirement.

Kekuanaoa Street is a County owned roadway, extending from Kilauea Avenue (located in Hilo) in the west to Hawaii Route 11 (located in Hilo) in the east, at which point it continues as Airport Road towards Hilo International Airport (ITO). In the surrounding project area, it is classified as a major collector. In the study area, Kekuanaoa Street is a two-way, two-lane road travelling primarily in the east-west direction. Paved sidewalks with curb and gutter exist sporadically throughout the corridor but are not continuous throughout the study limits between Manono Street and Hawaii Route 11. There are no marked bike facilities along this stretch of roadway, nor are there shoulders. Within the study area, parking is not permitted along Kekuanaoa Street. The posted speed limit is 35 MPH in the study area.

Mililani Street, Hinano Street, Laukapu Street, and Kalanikoa Street are all County owned residential roadways of similar characteristics in the vicinity of the project area. In general, they are two-way, twolane roads that travel primarily in the north-south direction between Piilani Street in the north (located in Hilo) and Kawili Street in the south (located in Hilo), although Kalanikoa Street extends all the way to Hawaii Route 19 in the north. In general, pavement width varies between 18- to 22-feet. Marked center lane lines are present on both Mililani Street and Kalanikoa Street throughout; however, they are only present at intersection approaches along Hinano Street and Laukapu Street. Paved sidewalks with curb and gutter are generally not present along these corridors, although some are sporadically located at intersections. There are no dedicated bike facilities along these corridors. Within the study area, the pavement width is not wide enough to permit parking; however, it is numerous vehicles were observed parked parallel to the roadway outside of the paved shoulder. The posted speed limit along these corridors is 25 MPH. Mililani Street north of Piilani Street, adjacent to the proposed development, is unimproved.

### B. Study Intersections

In the surrounding area, five study intersections were analyzed, as shown in Figure 3. These were selected by identifying significant intersections anticipated to be impacted by project-related trips which would add 3% or greater traffic to their forecasted volumes, per HDOT standard practice. Existing multimodal facilities are shown in Figure 4, and existing intersection lane configurations are shown in Figure 5.

### 1. Hawaii Route 19 & Manono Street/Lihiwai Street

Hawaii Route 19 at Manono Street/Lihiwai Street is a signalized, four-leg, intersection. Manono Street is the southern approach to the intersection, which turns into Lihiwai Street north of the intersection. Both the westbound (WB) and eastbound (EB) approaches of Hawaii Route 19 have dedicated left and right turn lanes, along with two through lanes. The NB and SB approaches of Manono Street and Lihiwai Street have dedicated left turn lanes, along with a shared through-right lane. All approaches have protected-permitted left turn phasing. There are marked crosswalks on all legs of the intersection. Paved sidewalks with curb and gutter are provided on all sides of the intersection, with curb ramps at each corner. Auxiliary acceleration lanes for right-turning vehicles are provided along Hawaii Route 19 on both sides of the intersection. Through observation, it was determined that the traffic signal controller at Hawaii Route 19 and Manono Street/Lihiwai Street was fully-actuated. It was also observed that phase lengths varied each cycle depending on the vehicular demand. During numerous cycles, the protected-left turn phases along Hawaii Route 19 would be skipped if no vehicles were queued in the left turn only lanes. Vehicular loop detectors were identified in both the left turn only, as well as the through lanes at all four approaches to the intersection. Threefore, the traffic signal was modeled as actuated-uncoordinated.

# 2. Manono Street & Piilani Street

Manono Street at Piilani Street is a four-leg, stop-controlled, intersection. Stop-control is provided in the WB and EB directions along Piilani Street. All approach legs have one shared left-through-right lane. There is a marked crosswalk on the north side of the intersection with curb ramps provided. Paved sidewalks with curb and gutter are provided along Manono Street to the north of the intersection, but not to the south. The project site is situated NW of this intersection.

#### 3. Hawaii Route 11 & Piilani Street

Hawaii Route 11 at Piilani Street is a three-leg, stop-controlled, intersection. Stop-control is provided in the EB direction along Piilani Street. The NB approach of Hawaii Route 11 has a dedicated left turn lane, along with two through lanes. The SB approach of Hawaii Route 11 has two through lanes, along with a shared through-right lane. The EB approach of Piilani Street functions as a shared left-right turn lane. An auxiliary median refuge lane on NB Hawaii Route 11 is provided for left-turning vehicles from Piilani Street, thereby allowing for EB left-turn traffic to only have to navigate one direction of Hawaii Route 11 at a time and reducing movement delay. There is a marked crosswalk on the west side of the intersection with curb ramps provided. Paved sidewalks with curb and gutter are provided along the western side of Hawaii Route 19.



Figure 3: Study Intersections and HDOT Tube Count Stations



**Figure 4: Existing Multimodal Facilities** 



**Figure 5: Existing Intersection Lane Configurations** 

#### 4. Manono Street & Kekuanaoa Street

Manono Street at Kekuanaoa Street is a signalized, four-leg, intersection. All approaches have dedicated left turn lanes with protected-permitted left turn phasing, along with a shared through-right lane. There are marked crosswalks on all legs of the intersection. Paved sidewalks with curb and gutter are provided on all sides of the intersection, with curb ramps at each corner. Vehicular detection is unknown at the signalized intersection of Manono Street and Kekuanaoa Street. As a result, the traffic signal was modeled as pretimed, with cycle length and splits optimized for each peak hour.

#### 5. Mililani Street & Kekuanaoa Street

Mililani Street at Kekuanaoa Street is a four-leg, stop-controlled, intersection. Stop-control is provided in the NB and SB directions along Mililani Street. All approach legs have one shared left-through-right lane. There are no marked crosswalks, paved sidewalk, or curb and gutter provided at the intersection.

#### C. Vehicle Volumes

#### 1. 24-Hour Volume

Historic Hawaii Department of Transportation (HDOT) annual average daily traffic counts (AADT) on Manono Street between Kuawa Street and Piilani Street (see Figure 3 for count location) were available between 2013-2021, with the exception of 2017-2018 when no data was collected. 24-hour, two-directional counts were also collected on Wednesday, April 6<sup>th</sup>, 2022, at the same location. Appendix A includes the detailed historical HDOT traffic data and the 2022 24-hour tube count data results. A summary of the historical HDOT and recent 2022 counts is shown in Table 1.

Year	24-Hour Average ADT
2013	10,723
2014	10,370
2015	8,905
2016	8,031
2017	-
2018	-
2019	10,320
2020*	8,763
2021*	9,953
2022**	10,149
*Collected	d during Covid-19 Pandemic
**Non-HD	OT 24-Hour Counts

#### Table 1: 24-Hour Volume on Manono Street between Kuawa Street and Piilani Street

Figure 6 shows the 24-hour volume distribution between 2019-2022 along Manono Street between Kuawa Street and Piilani Street. Although traffic volumes fluctuated from year to year, peak hour volumes generally occurred around the same time. The 2022 AM and PM peak hours were found to occur between 7:30-8:30 AM and 3:45-4:45 PM, respectively, with the PM peak hour having the heaviest daily volumes.



Figure 6: 24-Hour Volume Distribution on Manono Street between Kuawa Street and Piilani Street

#### (1) Covid-19 Traffic Impacts

The Covid-19 pandemic led to a 14-day quarantine of incoming travelers and the closure of non-essential businesses in the State of Hawaii beginning in March 2020. Towards the end of 2020, businesses began reopening, and non-essential employees began going back to work. Tourism slowly started to return as well. Beginning in the 2021 school year, Hawaii public schools reinstated in-person learning.

Based on data from Table 1, the 2022 24-hour volumes were similar to the pre-pandemic 2019 AADT. Additionally, throughout the pandemic, HDOT has periodically collected traffic counts at various stations to analyze traffic volumes and how they compare to pre-pandemic levels. The closest station to the proposed development is located on Hawaii Route 11 between Halekauila Street and Pohaku Street, approximately 0.90 miles south of the study intersection of Hawaii Route 11 and Piilani Street. The most recent data provided by HDOT was taken on December 15<sup>th</sup>, 2021, in which traffic volumes were approximately 5% higher than 2019 data. As a result, it can be assumed that counts collected on April 6<sup>th</sup>, 2022, are reflective of typical traffic volumes in the area, and no adjustment for Covid is needed.

#### 2. Intersection Peak Turning Movement Counts

Turning movement counts were taken at the five study intersections on Wednesday, April 6<sup>th</sup>, 2022, from 6:30-9:30 AM, and 3:00-6:00 PM. The AM and PM peak hours occurred between 7:30-8:30 AM and 3:45-

4:45 PM, respectively. Appendix A includes the raw traffic count data at the study intersections. Figure 7 shows the AM and PM peak hour volumes at the study intersections.

#### 3. Transit Facilities

The County public bus transit system (Hele-On) operates numerous routes throughout Hilo and the surrounding region. However, there are no existing bus stops within a half-mile radius of the proposed development. The closest bus stop is located at Banyan Drive east of Lihiwai Street (Stop ID 127), approximately 0.7 miles north of the development (~13-minute walk). This bus stop serves Route 101 – Intra-Hilo Keaukaha, which runs along Hawaii Route 19 and serves the Keaukaha community to the NE of Hilo, as well as ITO. The route operates Monday-Sunday between 6:15–7:43 PM (shortened schedules on Sundays), with busses arriving at the stop every hour. The next closest bus stops are located on Kawili Street at the Hawaii Community College Campus (Stop IDs 107, 175), approximately 0.9 miles south of the development (~19-minute walk). These bus stops serve numerous destinations via the following routes: Route 10 – Hilo to Ocean View, Route 11/Red Line – Hilo to Volcano, Route 101 – Intra-Hilo Keaukaha, and Route 103 – Waiakea-Uka. Service times vary between the routes. Bus ridership data is unavailable. Appendix B includes detailed bus route schedules and maps for each of these routes.

#### 4. Pedestrian and Bicycle Volumes

Peak hour intersection pedestrian and bicycle volumes were taken at the existing study intersections on Wednesday, April 6<sup>th</sup>, 2022, from 6:30-9:30 AM and 3:00-6:00 PM. Pedestrian and bike volumes were minimal throughout all analyzed peaks. Hawaii Route 19 and Manono Street/Lihiwai Street had the highest amount of pedestrian activity, with up to six peak hour pedestrian crossings (PM peak), while Hawaii Route 11 and Piilani Street had the highest amount of bicycle activity, with six peak hour bicyclist movements recorded during the PM peak hour. Table 2 shows a summary of pedestrian and bicycle counts during the vehicular peak hours.

Intersection	Pede	strian	Bicyle		
Intersection	AM Peak	PM Peak	AM Peak	PM Peak	
Hawaii Route 19 & Manono Street/Lihiwai Street	2	6	1	1	
Hawaii Route 11 & Piilani Street	2	0	1	6	
Manono Street & Piilani Street	1	4	2	0	
Manono Street & Kekuanaoa Street	1	6	0	0	
Mililani Street & Kekuanaoa Street	5	3	0	0	

Table 2: P	Peak Hour	Pedestrian	and Bicycle	Volumes
------------	-----------	------------	-------------	---------



Figure 7: Existing (2022) Intersection Peak Hour Volumes

### D. Existing Automobile LOS

### 1. Methodology

Level of service (LOS) is a rating system used in traffic engineering to measure the effectiveness of roadway operating conditions. There are six LOS ranging from A to F. LOS A is defined as being the least interrupted flow conditions with little or no delays, whereas LOS F is defined as conditions where extreme delays exist. Guidelines state that LOS D or better is appropriate for the study intersection and movements. Intersection LOS and delay was determined for the AM and PM peak hours using Synchro Version 10.0 traffic analysis software.

As stated in the *HCM6* (TRB, 2016), LOS for an all-way stop controlled (AWSC) and a two-way stop controlled (TWSC) intersection is determined by the measured control delay (see Table 3). Delay at an AWSC intersection is defined for the intersection as a whole and for each movement. Delay at a TWSC intersection is defined by each minor movement and not for the intersection as a whole. Vehicles traveling along the major, free-flow road of a TWSC intersection, proceed through with minimal delay. Those vehicles approaching the intersection along the minor movement (side-street) are controlled by a stop sign and thus experience delay attributable to the volume of vehicles passing along the free-flow road and the gaps available. As stated in the HCM6 (TRB, 2016), roundabouts (including mini-roundabouts) share the same control delay thresholds as AWSC and TWSC intersections.

Average Control Delay (c/yeb)	LOS by v/c Ratio			
Average control belay (s/vell)	<=1.0	>1.0		
≤ 10.0	А	F		
>10 and ≤15	В	F		
>15 and ≤25	С	F		
>25 and ≤35	D	F		
>35 and ≤50	E	F		
>50	F	F		

#### **Table 3: LOS Criteria for Unsignalized Intersections**

Source: *HCM6* (TRB, 2016)

The LOS analysis for signalized intersections is determined by average total vehicle delay based on the methodologies of the *HCM6* (TRB, 2016), shown in Table 4. High numbers of vehicles passing through the intersection, long cycle lengths, inappropriate signal phasing, or poor signal progression can result in long delays, and consequently poor LOS.

-				
Average Control Delay (c/uch)	LOS by v/c Ratio			
Average control Delay (s/ven)	<=1.0	>1.0		
≤ 10.0	А	F		
>10 and ≤20	В	F		
>20 and ≤35	С	F		
>35 and ≤55	D	F		
>55 and ≤80	E	F		
>80	F	F		

#### **Table 4: LOS Criteria for Signalized Intersections**

Source: *HCM6* (TRB, 2016)

Another measure of intersection operation is the volume to capacity (v/c) ratio. This is the ratio of the volume of traffic utilizing the intersection compared to the maximum volume of vehicles that can be accommodated by the intersection during a specific period of time. A v/c ratio under 0.85 means the intersection is operating under capacity and excessive delays are not experienced. An intersection is operating near its capacity when v/c ratios range from 0.85 to 0.95. Unstable flows are expected when the v/c ratio is between 0.95 and 1.0. Any v/c ratio greater than or equal to 1.0 indicates that the intersection is operating at or above capacity which results in a LOS F per the *HCM* (TRB, 2016). A traffic movement can have a poor LOS but low v/c which suggests that the traffic volumes along that movement are low but must wait a long time to make the movement. This is common for low volume protected turn movements or side streets that must wait through a long cycle length for their phase to come up.

# 2. Existing Intersection LOS Results

Existing LOS and delay (in seconds per vehicle) were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 5 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Existing (2022) conditions can be found in Appendix C.

# (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (2) Hawaii Route 11 & Piilani Street

As Synchro is unable to analyze the impacts of a median refuge lane when analyzing the EB left turning movements at Hawaii Route 11 and Piilani Street, NB through volumes were omitted as to only analyze the ability for EB left turning vehicles to find gaps in the SB traffic and NB left turning movements. With a median refuge lane, turning vehicles can complete their turn in two separate movements, limiting the number of potential conflict points when compared to a standard intersection (see Figure 8). All other movements at this intersection were analyzed with volumes as shown in Figure 7.

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

# (3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

# (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

# (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

				DM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS	
Hawaii Route 19 & Manono Street/Lihiwai Street	19.4	-	В	23.2	-	С	
Hawaii Route 19 EB Left	12.5	0.27	В	15.1	0.27	В	
Hawaii Route 19 EB Through	15.1	0.35	В	19.5	0.44	B	
Hawaii Route 19 EB Right	18.0	0.48	В	26.7	0.68	С	
Hawaii Route 19 WB Left	11.6	0.16	В	14.8	0.22	В	
Hawaii Route 19 WB Through	17.6	0.52	В	20.3	0.48	С	
Hawaii Route 19 WB Right	12.8	0.02	В	15.8	0.02	В	
Manono Street NB Left	26.0	0.60	С	27.0	0.71	С	
Manono Street NB Through-Right	25.5	0.37	С	22.3	0.23	С	
Lihiwai Street SB Left	26.0	0.08	С	27.7	0.08	С	
Lihiwai Street SB Through-Right	35.0	0.74	D	37.5	0.76	D	
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)	
Hawaii Route 11 NB Left	19.3	0.50	С	19.9	0.37	С	
Hawaii Route 11 NB Through	- 1	-	-	-	-	-	
Hawaii Route 11 SB Through-Right	-		-	-	-	-	
Piilani Street EB Left-Right	20.2	0.23	С	20.8	0.39	С	
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)	
Manono Street NB Left-Through-Right	8.1	0.01	A	8.2	0.01	A	
Manono Street SB Left-Through-Right	8.1	0.05	A	8.2	0.07	A	
Piilani Street EB Left-Through-Right	21.6	0.16	С	22.6	0.20	С	
Piilani Street WB Left-Through-Right	17.2	0.35	С	20.9	0.41	С	
Manono Street & Kekuanaoa Street	29.2	-	С	29.0	-	С	
Manono Street NB Left	21.8	0.25	С	21.0	0.16	С	
Manono Street NB Through-Right	32.3	0.64	С	28.6	0.51	С	
Manono Street SB Left	22.7	0.28	С	21.5	0.26	С	
Manono Street SB Through-Right	30.0	0.56	С	32.5	0.65	С	
Kekuanaoa Street EB Left	22.6	0.35	С	20.5	0.31	С	
Kekuanaoa Street EB Through-Right	25.8	0.52	С	32.0	0.72	С	
Kekuanaoa Street WB Left	17.2	0.07	В	22.3	0.33	С	
Kekuanaoa Street WB Through-Right	33.4	0.75	С	29.2	0.63	С	
Mililani Street & Kekuanaoa Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)	
Mililani Street NB Left-Through-Right	22.1	0.13	С	16.0	0.08	C	
Mililani Street SB Left-Through-Right	17.3	0.15	С	12.8	0.12	В	
Kekuanaoa Street EB Left-Through-Right	8.8	0.02	A	8.4	0.02	A	
Kekuanaoa Street WB Left-Through-Right	8.3	0.01	А	8.6	0.00	А	

# Table 5: Existing (2022) LOS



Figure 8: Vehicular Points (a) with a Median Refuge Lane vs (b) a Standard Intersection

# **III. FUTURE WITHOUT PROJECT CONDITIONS**

Regional traffic growth and future surrounding area development's traffic were added to the roadway network and analyzed for Future conditions for the years 2027, 2032, and 2042.

# A. Upcoming Planned Projects

# 1. STIP

Research was completed on March 29<sup>th</sup>, 2022 at the Statewide Transportation Improvements Program (STIP) FY 2019-2022 website. The STIP is a four-year forecast that identifies state and county transportation projects to be funded with Federal Highway and Federal Transit funds. There were no roadway construction or other projects listed in the STIP (2019-2022) that would impact the project area.

# 2. ERP (Previously OEQC)

Research was completed on March 29<sup>th</sup>, 2022 at the State of Hawaii *Environmental Review Program* (ERP) website, which as of July 2021 took the place of the former *Office of Environmental Quality Control* (OEQC) website. The ERP website provides Environmental Impact Statements (EIS) and Environmental Assessments (EA) available to the public. Projects from the ERP website in the surrounding area from 2017-2022 were reviewed.

# (1) Hale Ola O Mohouli Affordable Housing

Hale Ola O Mohouli is an expansion of the existing Mohouli Senior Residences located on Mohouli Street between Komohana Street and Kukuau Street, approximately two miles southwest (SW) of the proposed development project site. The *Hale Ola o Mohouli Affordable Residential Development TIAR* (AECOM, 2021) was completed to analyze this expansion, which was reviewed to determine the potential future impact. The project proposes to add up to an additional 90 affordable residential units, and thus anticipates an additional 48 AM Peak Hour trips, and 68 PM Peak Hour trips. Due to its location two miles away, it can be assumed that the Hale Ola O Mohouli Affordable Housing expansion will have minimal impact on the Hawaiian Kingdom Brands project site, and therefore no trips from this facility were added.

# (2) Hilo Iron Works

The *Hilo Iron Works TIAR* (SSFM, 2019) was reviewed to determine the potential future impact. The existing facility is located at the NW corner of Hawaii Route 19 and Manono Street, approximately 2,200 feet north of the proposed Hawaiian Kingdom Brands project site. The TIAR studied existing traffic within property. No new development was proposed within the property, and no significant change in vehicle trips was anticipated. Therefore, it can be assumed that traffic from this facility is already accounted for in the collected 2022 volumes, and therefore no additional trips from this facility were added.

# (3) Bank of Hawaii

Bank of Hawaii is proposing a new facility at 1339 Kinoole Street in Hilo, Hawaii, approximately one mile SW of the proposed development. *The Hilo Bank of Hawaii TIAR* (SSFM, 2018) was completed to analyze this development, which was reviewed to determine the potential future impact. The project proposes to redevelop four existing single family dwelling units on the existing property, creating a 7,500 sf bank. The project's original complete build out was expected by 2020; however, as of March 2022, construction had yet to begin. It was anticipated that the project would add 53 additional AM Peak Hour trips, and 163

additional PM Peak Hour trips. However, the majority of this generated traffic was projected to be added along Lanikaula Street. Therefore, due to minimal impact in the area surrounding the Hawaiian Kingdom Brands project site, no additional trips from this facility were added.

### (4) South Hilo Sanitary Landfill Closure

The *Traffic Assessment* (TA) *For The South Hilo Sanitary Landfill* (Wilson Okamoto, 2017) analyzed the traffic impacts projected as a result of closing the landfill (SHSL). With this closure, county waste trucks as well as commercial haulers will be diverted to the West Hawaii Sanitary Landfill (WHSL) located in Puuanahulu, 70-miles west of the existing site. These vehicles are projected to be rerouted to the WHSL via Saddle Road, with an anticipated 29 additional AM Peak Hour trips, and 12 additional PM Peak Hour trips. As of June 2020, the SHSL closure was nearly complete. Therefore, it can be assumed that traffic impacts from this closure were accounted for in the collected 2022 volumes, and thus no additional volume adjustments are needed.

#### (5) Island Naturals Complex

COH planners noted that Island Naturals Properties, LLC applied for a special management area (SMA) use permit in April 2021, proposing to construct a 67,685 sf retail and office complex at the NW corner of Mililani Street and Kekuanaoa Street on an existing 4.045-acre undeveloped lot, as detailed in the *County of Hawaii Planning Department Background Report – SMA 21-000079* (COH Planning Department, April 2021). The applicant currently operates a grocery store within a nearby strip mall in the Hilo Shopping Center located at the SE corner of the intersection of Kekuanaoa Street and Kilauea Avenue, approximately 0.25-miles away from the proposed site. The developer is looking to relocate their grocery store to this new site and develop a one-stop commercial retail and office center with other businesses aimed at providing goods and everyday services for both residents and visitors. The phasing of the development is still undecided; however, the applicant forecasts that full-buildout is anticipated by 2026.

No TIAR was completed as a part of this development's application. However, as a part of the permit, the applicant projects that the development will generate at least 50 vehicular movements during the peak hours. The developer also noted that retail operations will generally start post AM peak hour, around 10:00 AM, and that 50% of the applicant's employees begin work after 8:30 AM. It was also noted that at least 75% of employees leave before 3:30 PM and/or after 6:30 PM. With no TIAR and no specific trip generation or distribution provided for the development, the traffic impact specifics cannot be accurately predicted.

It should be noted that trip generation done based solely upon the proposed land uses documented in the application add up to 282 additional AM peak hour trips and 486 additional PM peak hour trips (see Table 6). The application estimates these total number of peak hour trips to be lower due to various trip reduction factors that are not explicitly explained. It is noted that due to the existing location of the grocery store, these trips are largely already in place within the surrounding roadway network. This would mean that cumulative trip generation may be limited to the other developments proposed within this complex. However, even without the trips resulting from the grocery store, total AM and PM peak hour trips result in 208 and 226 vehicles, respectively. It should be noted that the trip generation anticipated

by the Kanaka Beverage & Cafe development (to be discussed in a later section) is projected to be significantly lower than the unadjusted trip generation as part of the Island Naturals development.

Dhees /Land Lise	Area (1000 CE)	ITC Lond Lise	AN	A Peak Ho	our	PN	л Peak Ho	ur
Phase/Land Use	Area (1000 SF)	TTE Land Use	In	Out	Total	In	Out	Total
Phase 1								
Island Naturals Store	26.0	850 - Supermarket	44	30	74	130	130	260
Office Space	8.9	710 - General Office Building	18	3	21	4	18	22
Total:			62	33	95	134	148	282
Phase 2								
Drive-Through Restaurant	3.0	934 - Fast Food Restaurant with Drive-Through	68	66	134	52	47	99
Total:			68	66	134	52	47	99
Phase 3								
Retail Space	10.3	822 - Strip Retail Plaza (<40k)	18	11	29	40	40	80
Office Space	10.3	710 - General Office Building	21	3	24	4	21	25
Total:			39	14	53	44	61	105
Total of All Phases:			169	113	282	230	256	486

Table 6: Island Naturals Complex Trip Generation

As a part of the buildout of the site, the Island Naturals Complex developer is proposing two full movement access driveways off of Mililani Street as well as Hualani Street. The proposal predicts that splitting left-turn movements between these side-street accesses will help reduce backup. The developer is also proposing two right-in right-out (RIRO) driveways off Kekuanaoa Street, which they state will eliminate or minimize back up of traffic along Kekuanaoa Avenue.

In response to the Island Naturals Complex proposal, the COH Department of Public Works (DPW) recommended they install a left-turn lane in the EB direction at the intersection of Kekuanaoa Street and Mililani Street; however, the applicant believes traffic impacts to the surrounding roadways will be reduced by the limited aforementioned accesses, and the status of this additional left-turn lane is unclear. No other known improvements are planned along the surrounding roadway network as a result of this proposed development.

Without a TIAR detailing more specific trip generation and distribution, future traffic volumes for this development cannot be accurately forecast and distributed as part of this report.

# 3. Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii

The *Federal-Aid Highways 2035 Transportation Plan* (HDOT, 2014) lists various *Roadway Infrastructure Potential Solutions* on corridors throughout the study area, including:

- Hawaii Route 11 between Hawaii Route 19/Kalanianaole Avenue and Makalika Street: Proposed improvements include providing an additional two travel lanes with turn lanes at major intersections, bicycle facilities and sidewalks.
- *Hawaii Route 19 at Manono Street:* Proposed intersection operational improvements, although it is not specified what these specifically entail.
- *Manono Street between Hawaii Route 19 and Kawili Street* Proposed improvements include installing bike lanes.
- Kekuanaoa Street between Kilauea Avenue and Hawaii Route 11

Proposed improvements include providing an additional two travel lanes with separate turning lanes at major intersections, as well as bike lanes.

No specific construction dates were listed for these improvements. As such, for consideration of the worst-case scenario that utilizes the existing lane configurations, it was assumed that they will not be constructed in the near future and therefore were not applied to future analysis years.

#### B. Volumes

### 1. Background Growth

Various transportation plans and historical traffic volumes were considered when determining the background growth volume for the surrounding region. Covid-19 impacts to traffic volumes were considered as well.

The *Statewide Federal-Aid Highways 2035 Transportation Plan for the State of Hawaii* (CH2M, 2014) forecasts a compounded annual increase in traffic volumes of 1.28% between 2007 and 2035 in the South Hilo planning district (see Table 7).

Tuble 7. Trainer of clast Baily vehicles Trips in South The							
Voor	Statewide Federal-Aid Highway 2035 Transportation Plan						
Tear	Population	Daily Vehicle Trips					
2007	47,620	157,290					
2035	50,540	224,570					
Growth Rate	0.21%	1.28%					

### Table 7: Traffic Forecast - Daily Vehicles Trips in South Hilo

Historical HDOT traffic volumes along Manono Street varied between 2013-2022, with recorded traffic volumes being higher in 2013 (10,723) than pre-pandemic volumes in 2019 (10,320). Conservatively, a 1.28% growth rate, to align with the transportation plan forecast, was applied to high-volume regional traffic movements (identified with red arrows), as shown in Figure 9. Traffic impacts resulting from regional or other projects not identified in the STIP and ERP are assumed to be included in the 1.28% annual growth rate. Figures 10-12 show the resulting Future Without Project volumes forecast for 2027, 2032, and 2042, respectively.



Figure 9: Study Intersection Regional Traffic Volume Movements



Figure 10: Future (2027) Without Project Peak Hour Volumes



Figure 11: Future (2032) Without Project Peak Hour Volumes



Figure 12: Future (2042) Without Project Peak Hour Volumes

#### C. Future Without Project LOS

### 1. Future (2027) Without Project Conditions

Future (2027) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 8 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Future (2027) Without Project conditions can be found in Appendix D.

	AM			PM		
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.2	-	С	24.0	-	С
Hawaii Route 19 EB Left	13.2	0.28	В	15.5	0.29	В
Hawaii Route 19 EB Through	15.8	0.38	В	20.2	0.47	С
Hawaii Route 19 EB Right	19.1	0.52	В	29.0	0.72	С
Hawaii Route 19 WB Left	12.1	0.17	В	15.2	0.23	В
Hawaii Route 19 WB Through	18.7	0.56	В	21.1	0.51	С
Hawaii Route 19 WB Right	13.2	0.02	В	16.0	0.02	В
Manono Street NB Left	26.6	0.62	С	27.8	0.73	С
Manono Street NB Through-Right	25.4	0.36	С	22.2	0.22	С
Lihiwai Street SB Left	26.8	0.08	С	27.9	0.08	С
Lihiwai Street SB Through-Right	36.0	0.74	D	37.8	0.77	D
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Hawaii Route 11 NB Left	20.8	0.52	С	21.7	0.40	С
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	21.7	0.25	С	22.6	0.42	С
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Manono Street NB Left-Through-Right	8.1	0.01	А	8.2	0.01	А
Manono Street SB Left-Through-Right	8.1	0.05	А	8.2	0.07	А
Piilani Street EB Left-Through-Right	22.8	0.16	С	24.0	0.22	С
Piilani Street WB Left-Through-Right	18.1	0.37	С	22.3	0.43	С
Manono Street & Kekuanaoa Street	31.1	-	С	31.3	-	С
Manono Street NB Left	21.3	0.25	С	19.8	0.15	В
Manono Street NB Through-Right	31.8	0.65	С	26.9	0.50	С
Manono Street SB Left	22.1	0.28	С	20.1	0.25	С
Manono Street SB Through-Right	29.6	0.58	С	30.8	0.65	С
Kekuanaoa Street EB Left	25.1	0.39	С	23.1	0.36	С
Kekuanaoa Street EB Through-Right	28.0	0.58	С	40.1	0.83	D
Kekuanaoa Street WB Left	18.1	0.08	В	25.8	0.40	С
Kekuanaoa Street WB Through-Right	38.7	0.83	D	31.9	0.68	С
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Mililani Street NB Left-Through-Right	24.0	0.15	С	16.9	0.08	С
Mililani Street SB Left-Through-Right	18.3	0.16	С	13.1	0.12	В
Kekuanaga Street FB Left-Through-Right						
	8.9	0.02	A	8.5	0.02	A

<b>Table 8: Future</b>	(2027)	Without	Projec	t Conditions
------------------------	--------	---------	--------	--------------

#### (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

### (2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

### (3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

#### (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

### (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

### 2. Future (2027) Without Project Mitigation

No further mitigation is needed at any intersection for the Future (2027) Without Project conditions.

# 3. Future (2032) Without Project Conditions

Future (2032) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 9 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Future (2032) Without Project conditions can be found in Appendix D.

#### (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

#### (3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

		AM			PM	
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.6	-	С	25.2	-	С
Hawaii Route 19 EB Left	13.6	0.30	В	16.2	0.30	В
Hawaii Route 19 EB Through	16.1	0.40	В	21.1	0.51	С
Hawaii Route 19 EB Right	19.9	0.55	В	32.4	0.78	С
Hawaii Route 19 WB Left	12.2	0.18	В	15.9	0.24	В
Hawaii Route 19 WB Through	19.3	0.60	В	22.1	0.55	С
Hawaii Route 19 WB Right	13.2	0.02	В	16.4	0.02	В
Manono Street NB Left	28.3	0.67	С	27.6	0.74	С
Manono Street NB Through-Right	25.4	0.36	С	21.9	0.22	С
Lihiwai Street SB Left	26.8	0.08	С	28.3	0.08	С
Lihiwai Street SB Through-Right	36.0	0.74	D	38.3	0.77	D
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Hawaii Route 11 NB Left	22.6	0.55	С	24.0	0.43	С
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	23.8	0.27	С	24.9	0.45	С
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Manono Street NB Left-Through-Right	8.2	0.01	А	8.3	0.01	А
Manono Street SB Left-Through-Right	8.2	0.05	А	8.2	0.07	А
Piilani Street EB Left-Through-Right	24.3	0.18	С	25.6	0.23	D
Piilani Street WB Left-Through-Right	19.1	0.38	С	24.0	0.46	С
Manono Street & Kekuanaoa Street	33.2	-	С	33.0	-	С
Manono Street NB Left	21.7	0.27	С	21.1	0.17	С
Manono Street NB Through-Right	33.1	0.69	С	28.6	0.54	С
Manono Street SB Left						
	22.6	0.29	С	21.2	0.26	С
Manono Street SB Through-Right	22.6 30.7	0.29 0.62	C C	21.2 34.2	0.26 0.72	C C
Manono Street SB Through-Right Kekuanaoa Street EB Left	22.6 30.7 26.9	0.29 0.62 0.43	C C C	21.2 34.2 22.8	0.26 0.72 0.36	С С С
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right	22.6 30.7 26.9 29.3	0.29 0.62 0.43 0.63	C C C C	21.2 34.2 22.8 42.2	0.26 0.72 0.36 0.86	C C C D
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left	22.6 30.7 26.9 29.3 18.5	0.29 0.62 0.43 0.63 0.09	C C C C B	21.2 34.2 22.8 42.2 26.5	0.26 0.72 0.36 0.86 0.42	C C D C
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right	22.6 30.7 26.9 29.3 18.5 43.1	0.29 0.62 0.43 0.63 0.09 0.87	C C C B D	21.2 34.2 22.8 42.2 26.5 31.7	0.26 0.72 0.36 0.86 0.42 0.70	C C D C C
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street	22.6 30.7 26.9 29.3 18.5 43.1 Unsi	0.29 0.62 0.43 0.63 0.09 0.87 gnalized (TV	C C C B D VSC)	21.2 34.2 22.8 42.2 26.5 31.7 Unsi	0.26 0.72 0.36 0.86 0.42 0.70 gnalized (TV	C C D C C VSC)
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street NB Left-Through-Right	22.6 30.7 26.9 29.3 18.5 43.1 Unsi 26.0	0.29 0.62 0.43 0.63 0.09 0.87 gnalized (TV 0.16	C C C B D VSC)	21.2 34.2 22.8 42.2 26.5 31.7 Unsi 17.9	0.26 0.72 0.36 0.86 0.42 0.70 gnalized (TV 0.09	C C D C C VSC) C
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street SB Left-Through-Right Mililani Street SB Left-Through-Right	22.6 30.7 26.9 29.3 18.5 43.1 Unsi 26.0 19.4	0.29 0.62 0.43 0.63 0.09 0.87 gnalized (TV 0.16 0.17	C C C B D VSC) C	21.2 34.2 22.8 42.2 26.5 31.7 Unsi 17.9 13.5	0.26 0.72 0.36 0.86 0.42 0.70 gnalized (TV 0.09 0.12	C C D C C VSC) C B
Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street SB Left-Through-Right Kekuanaoa Street EB Left-Through-Right	22.6 30.7 26.9 29.3 18.5 43.1 Unsi 26.0 19.4 9.0	0.29 0.62 0.43 0.63 0.09 0.87 gnalized (TV 0.16 0.17 0.02	C C C B D VSC) C A	21.2 34.2 22.8 42.2 26.5 31.7 Unsi 17.9 13.5 8.6	0.26 0.72 0.36 0.86 0.42 0.70 gnalized (TV 0.09 0.12 0.02	C C D C C VSC) C B A

Table 9: Future (2032)	Without Project Cor	nditions
------------------------	---------------------	----------

# 4. Future (2032) Without Project Mitigation

No further mitigation is needed at any intersection for the Future (2032) Without Project Conditions.

#### 5. Future (2042) Without Project Conditions

Future (2042) Without Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 10 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Future (2042) Without Project conditions can be found in Appendix D.

		AM			PM			
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS		
Hawaii Route 19 & Manono Street/Lihiwai Street	23.3	- C		28.7	-	С		
Hawaii Route 19 EB Left	16.2	0.36	В	17.7	0.35	В		
Hawaii Route 19 EB Through	18.6	0.47	В	23.2	0.58	С		
Hawaii Route 19 EB Right	24.3	0.65	С	43.5	0.89	D		
Hawaii Route 19 WB Left	13.9	0.20	В	17.2	0.28	В		
Hawaii Route 19 WB Through	23.2	0.71	С	24.5	0.63	С		
Hawaii Route 19 WB Right	14.6	0.02	В	17.2	0.02	В		
Manono Street NB Left	27.7	0.68	С	29.6	0.78	С		
Manono Street NB Through-Right	24.4	0.32	С	21.9	0.21	С		
Lihiwai Street SB Left	28.1	0.09	С	29.5	0.08	С		
Lihiwai Street SB Through-Right	37.8	0.75	D	40.1	0.78	D		
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	ignalized (TV	VSC)		
Hawaii Route 11 NB Left	28.3	0.63	D	30.8	0.51	D		
Hawaii Route 11 NB Through	-	-	-	-	-	-		
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-		
Piilani Street EB Left-Right	30.7	0.34	D	32.7	0.54	D		
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	ignalized (TV	VSC)		
Manono Street & Piilani Street Manono Street NB Left-Through-Right	Unsi 8.4	gnalized (TV 0.01	VSC) A	Unsi 8.5	ignalized (TV 0.01	VSC) A		
Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right	Unsi 8.4 8.3	gnalized (TV 0.01 0.05	VSC) A A	Unsi 8.5 8.4	ignalized (TV 0.01 0.07	VSC) A A		
Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right Piilani Street EB Left-Through-Right	Unsi 8.4 8.3 28.1	gnalized (TV 0.01 0.05 0.20	VSC) A A D	Unsi 8.5 8.4 30.9	ignalized (TV 0.01 0.07 0.27	VSC) A A D		
Manono Street & Piilani Street         Manono Street NB Left-Through-Right         Manono Street SB Left-Through-Right         Piilani Street EB Left-Through-Right         Piilani Street WB Left-Through-Right	Unsi 8.4 8.3 28.1 21.9	gnalized (TV 0.01 0.05 0.20 0.43	VSC) A A D C	Unsi 8.5 8.4 30.9 29.7	ignalized (TV 0.01 0.07 0.27 0.53	A A D D		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa Street	Unsi 8.4 8.3 28.1 21.9 39.3	gnalized (TV 0.01 0.05 0.20 0.43 -	VSC) A A D C D	Unsi 8.5 8.4 30.9 29.7 40.4	gnalized (TV 0.01 0.07 0.27 0.53 -	VSC) A A D D D D		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB Left	Unsi 8.4 8.3 28.1 21.9 <b>39.3</b> 23.9	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31	VSC) A A D C C C C C	Unsi 8.5 8.4 30.9 29.7 40.4 23.4	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21	VSC) A A D D C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB Through-Right	Unsi 8.4 8.3 28.1 21.9 <b>39.3</b> 23.9 39.1	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79	VSC) A A D C D C D D	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62	VSC) A A D D C C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB Left	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34	VSC) A D C D C D C D C	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30	VSC) A A D D C C C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB Through-RightManono Street SB LeftManono Street SB LeftManono Street SB Left	Unsi 8.4 8.3 28.1 21.9 <b>39.3</b> 23.9 39.1 25.1 35.7	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73	VSC) A A D C C D C D C D C D C D C D C D	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85	VSC) A A D D C C C C D		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB Left	Unsi 8.4 8.3 28.1 21.9 <b>39.3</b> 23.9 39.1 25.1 35.7 30.7	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50	VSC) A A D C C D C D C D C C D C C C C C C C	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39	VSC) A A D C C C C C C C C C C C C C C C C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftManono Street SB LeftKekuanaoa Street SB LeftManono Street SB Through-RightKekuanaoa Street EB LeftKekuanaoa Street EB Left	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71	VSC) A A D C C D C D C D C C D C C C C C C	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 56.7	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97	VSC) A A D D C C C C C C C E		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftKanono Street SB LeftKekuanaoa Street EB LeftKekuanaoa Street EB Through-RightKekuanaoa Street EB Through-RightKekuanaoa Street EB Through-RightKekuanaoa Street WB Left	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10	VSC) A A D C D C D C D C D C D C B	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 23.6 56.7 31.6	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52	VSC) A A D D C C C C D C C C C C C C C C C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftKanono Street SB LeftKanono Street SB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB Through-RightKekuanaoa Street WB LeftKekuanaoa Street WB LeftKekuanaoa Street WB Through-Right	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7 53.9	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10 0.96	VSC) A A D C C D C D C D C C D C B B D	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 56.7 31.6 33.6	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52 0.76	VSC) A A D D C C C C C C C C C C C C C C C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street WB Left-Through-RightManono Street NB LeftManono Street NB LeftManono Street SB Through-RightKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street WB LeftKekuanaoa Street WB LeftKekuanaoa Street WB Through-RightMililani Street & Kekuanaoa Street	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7 53.9 Unsi	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10 0.96 gnalized (TV	VSC) A A D C C D C D C C D C C B B D VSC)	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 56.7 31.6 33.6 Unsi	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52 0.76 gnalized (TV	VSC) A A D C C C C C C C C C C C VSC)		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftManono Street SB LeftKanono Street SB LeftManono Street SB LeftManono Street SB LeftManono Street SB Through-RightKekuanaoa Street EB LeftKekuanaoa Street EB Through-RightKekuanaoa Street WB LeftKekuanaoa Street WB Through-RightMililani Street NB Left-Through-Right	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7 53.9 Unsi 32.2	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10 0.96 gnalized (TV 0.20	VSC) A A D C C D C D C D C C D C C B D VSC) D	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 56.7 31.6 33.6 Unsi 20.4	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52 0.76 gnalized (TV 0.11	VSC) A A D D C C C C C C C C C C VSC) C C		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftManono Street SB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB Through-RightKekuanaoa Street WB LeftKekuanaoa Street WB LeftKekuanaoa Street WB Through-RightMililani Street NB Left-Through-RightMililani Street SB Left-Through-RightMililani Street SB Left-Through-Right	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7 53.9 Unsi 32.2 22.5	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10 0.96 gnalized (TV 0.20 0.20	VSC) A A D C D C D C D C D C C B D VSC) D C C C C C C C C C C C C C C C C C C	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 23.6 56.7 31.6 33.6 Unsi 20.4 14.5	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52 0.76 gnalized (TV 0.11 0.14	VSC) A A A D D C C C C C C C C C VSC) C B		
Manono Street & Piilani StreetManono Street NB Left-Through-RightManono Street SB Left-Through-RightPiilani Street EB Left-Through-RightPiilani Street WB Left-Through-RightManono Street & Kekuanaoa StreetManono Street NB LeftManono Street NB LeftManono Street SB LeftManono Street SB LeftManono Street SB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street EB LeftKekuanaoa Street WB LeftKekuanaoa Street WB Through-RightKekuanaoa Street WB Through-RightMililani Street NB Left-Through-RightMililani Street SB Left-Through-RightKekuanaoa Street EB Left-Through-RightMililani Street SB Left-Through-RightMililani Street SB Left-Through-RightMililani Street EB Left-Through-RightKekuanaoa Street EB Left-Through-Right	Unsi 8.4 8.3 28.1 21.9 39.3 23.9 39.1 25.1 35.7 30.7 31.3 18.7 53.9 Unsi 32.2 22.5 9.3	gnalized (TV 0.01 0.05 0.20 0.43 - 0.31 0.79 0.34 0.73 0.50 0.71 0.10 0.96 gnalized (TV 0.20 0.20 0.02	VSC) A A D C D C D C D C D C D C B D VSC) D C A	Unsi 8.5 8.4 30.9 29.7 40.4 23.4 31.5 22.7 43.6 23.6 56.7 31.6 33.6 Unsi 20.4 14.5 8.7	gnalized (TV 0.01 0.07 0.27 0.53 - 0.21 0.62 0.30 0.85 0.39 0.97 0.52 0.76 gnalized (TV 0.11 0.14 0.02	VSC) A A A D D C C C C C C C C C C C C C C C		

#### (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

### (2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

### (3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (4) Manono Street & Kekuanaoa Street

At the signalized intersection of Manono Street and Kekuanaoa Street, the EB through-right lane resulted in poor LOS E during the PM peak hour (v/c ratio of 0.97). With increased traffic volumes along both Manono Street and Kekuanaoa Street, due to forecasted background growth, LOS deteriorates over time compared to the Existing (2022) conditions. All other movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

### (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### 6. Future (2042) Without Project Mitigation

Potential mitigation was considered at Manono Street and Kekuanaoa Street for the Future (2042) Without Project Conditions.

# (1) Manono Street & Kekuanaoa Street

Under the existing traffic signal configuration, the Kekuanaoa Street EB through-right lane is projected to operate at LOS E during the PM peak hour (v/c ratio of 0.97). Delay for this lane will increase compared to the Existing (2022) conditions due to continual background growth along both Manono Street and Kekuanaoa Street.

Currently, each approach has a dedicated left-turn lane and a shared through-right lane, with each Kekuanaoa Street leg being 45-feet wide. With excess roadway width present at the intersection, dedicated right turn lanes can be marked along Kekuanaoa Street in both the EB and WB directions, allowing the existing through-right lanes to be converted to through-only lanes. By separating turning movements, intersection capacity will increase, improving the overall LOS, which can be seen in Table 11. Synchro reports for the Future (2042) Without Project Mitigation can be found in Appendix E.

Table 11: Future (2042) Without Project Mitigation LOS Comparison at Manono Street and Kekuanaoa

Street									
		AM		PM					
Traffic Signal (Existing Lane Configuration)	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS			
Manono Street & Kekuanaoa Street	39.3	-	D	40.4	-	D			
Manono Street NB Left	23.9	0.31	С	23.4	0.21	С			
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	С			
Manono Street SB Left	25.1	0.34	С	22.7	0.30	С			
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D			
Kekuanaoa Street EB Left	30.7	0.50	С	23.6	0.39	С			
Kekuanaoa Street EB Through-Right	31.3	0.71	С	56.7	0.97	E			
Kekuanaoa Street WB Left	18.7	0.10	В	31.6	0.52	С			
Kekuanaoa Street WB Through-Right	53.9	0.96	D	33.6	0.76	С			
		AM		PM					
Kekuanaoa Street)	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS			
Manono Street & Kekuanaoa Street	35.8	-	D	34.1	-	С			
Manono Street NB Left	23.9	0.31	С	23.4	0.21	С			
Manono Street NB Through-Right	39.1	0.79	D	31.5	0.62	С			
Manono Street SB Left	25.1	0.34	С	22.7	0.30	С			
Manono Street SB Through-Right	35.7	0.73	D	43.6	0.85	D			
Kekuanaoa Street EB Left	27.9	0.45	С	22.1	0.36	С			
Kekuanaoa Street EB Through	29.0	0.64	С	40.0	0.85	D			
Kekuanaoa Street EB Right	19.3	0.06	В	19.9	0.11	В			
Kekuanaoa Street WB Left	18.1	0.09	В	25.9	0.42	С			
Kekuanaoa Street WB Through	45.5	0.90	D	30.4	0.69	С			
Kekuanaoa Street WB Right	19.2	0.05	В	19.4	0.07	В			

Therefore, as part of mitigation for the Future (2042) Without Project conditions, it is recommended to consider reconfiguring the EB and WB approaches along Kekuanaoa Street to have dedicated right turn lanes, allowing the existing through-right lanes to be converted to through-only lanes.

# IV. FUTURE WITH PROJECT CONDITIONS

The proposed development construction is anticipated to begin by early 2023, with completion expected by early 2024. Therefore, it is assumed that all project-related trips will be in place for all three Future With Project scenarios (2027, 2032, and 2042).

# D. Future With Project Generated Volumes

#### 1. Project Related Volumes

The expected traffic from the proposed project was determined using the following four-step methodology: trip generation, trip distribution, modal choice, and route assignment.

### (1) Trip Generation

Trip generation was calculated using rates from *Trip Generation*, 11<sup>th</sup> Edition (ITE, September 2021) which is standard traffic engineering practice. The following land uses were considered for use with the proposed project:

- <u>Manufacturing (ITE Land Use Code 140)</u> facilities are defined as areas where raw materials or parts are converted into finished products. Sizes and types of activity vary between facilities. This land use accounts for the manufacturing facility itself, as well as associated offices, warehouses, and research areas.
- <u>Fast-Food Restaurant with Drive-Through Window (ITE Land Use Code 934)</u> are defined as restaurants with a large drive-through and carry-out clientele, with high turnover rates for any eat-in customers.

The resulting trip generation rates for the proposed development are provided in Table 12.

Land Lice Code	ITE	Indonondont Variable	AM Peak Ho	ur		PM Peak Hour			
Land Use Code	Code	independent variable	Equation In %		Out %	Equation	In %	Out %	
Manufacturing	140	1000 Sq. Ft. GFA	T = 0.61 (X) + 9.54	76	24	T = 0.87 (X) - 17.50	31	69	
Fast-Food Restaurant									
with Drive-Through	934	1000 Sq. Ft. GFA	T = 44.61 (X)	51	49	T = 33.03 (X)	52	48	
Window									

#### Table 12: Land Use Development Trip Generation Rates

*Trip Generation, 11<sup>th</sup> Edition* (ITE, September 2021) also provides average pass-by rates to be used for retail or commercial developments. Pass-by trips are characterized as trips that are made by traffic currently passing the site on an adjacent street or roadway. Pass-by rates for a Fast-Food Restaurant With Drive-Through are assumed to be applicable during the PM peak hour only (see Table 13).

#### Table 13: Pass-By-Rate (Trip Reduction) at Fast-Food Restaurant

Land Lice Code		Average Pass-By-Rate (Trip Reduction)				
Land Use Code	TTE Code	AM Peak Hour	PM Peak Hour			
Fast-Food Restaurant with Drive- Through Window	934	-	55.0%			

The resulting estimated trips expected from the development were calculated and are shown in Table 14.

Phase	Agency or Building	Land Use			AM	Peak H	lour	PM Peak Hour		
(Analysis Year)	Description	Code	Units	independent variable		Out	Total	In	Out	Total
2024	Manufacturing	140	30	1000 Sq. Ft. GFA	21	7	28	3	6	9
2024	Fast-Food Restaurant with Drive-Through Window	934	1.8	1000 Sq. Ft. GFA	41	39	80	30	29	59
Trip Reduction (Fast-Food Restaurant with Drive-Through Window)					-	-	-	-16	-16	-32
Totals					62	46	108	17	19	36

#### Table 14: Project Related Development Phasing and Trips Generated

# (2) Trip Distribution/Assignment

Project related trips were distributed/assigned along the four primary roadways in the surrounding area (Hawaii Route 19, Hawaii Route 11, Kekuanaoa Street, and Manono Street) based on their two-directional ADTs. These ADTs were based on information sourced from the 2018 Highway Performance Monitoring System Roads for Hawaii GIS Database (see Table 15). 2018 data was used to reflect pre-Covid traffic patterns as 2019 data was not available. It was assumed that project related trips would utilize these four local roadways in a manner similar with the 2018 traffic distributions. HPMS 2018 volumes can be seen in Appendix A.

HPMS 2018 GIS Hawaii Route 19 (at Manono) 16,800 25% Hawaii Route 11 (at Piilani) 24,900 38% Kekuanaoa Street (at Mililani and Kekuanaoa) 13,700 21% Manono Street (at Kekuanaoa) 10,300 16% Total 65,700 100%

\*Source: 2018 Highway Performance Monitoring System Roads for

Based on the ADT assessment:

Hawaii GIS Database

- 25% of project related trips were distributed/assigned along Hawaii Route 19 via Manono Street. At
  the intersection of Hawaii Route 19 and Manono Street/Lihiwai Street, trips were distrusted based on
  the 2022 intersection turning movement volumes. It was assumed that an insignificant percent of
  traffic would from the north leg of the intersection (Lihiwai Street) due to the minimal development
  north of the intersection. Therefore, no traffic was distributed/assigned along this leg of the
  intersection.
- 38% of project related trips were distributed/assigned along Hawaii Route 11 via Piilani Street. At the intersection of Hawaii Route 11 and Piilani Street, trips were distributed based on the 2022 intersection turning movement volumes.
- 21% of project related trips were distrusted/assigned along Kekuanaoa Street via both Manono Street and Mililani Street. It was assumed that no project related trips would be coming from/going towards Airport Road and Hilo Airport. Additionally, all project related trips travelling on Hawaii Route 11 were assumed be distributed/assigned to the site via Piilani Street. Therefore, all project related trips along Kekuanaoa Street were assumed to be coming from/heading towards the west. Of the 21% of project related trips along Kekuanaoa Street, half were assumed to travel along Mililani Street, while the remaining half were assumed to travel along Manono Street. This assumption was made as Kekuanaoa

Street and Manono Street is a signalized intersection, while Kekuanaoa Street and Mililani Street is an unsignalized intersection. Vehicles are estimated to use both corridors dependent on observed traffic at the signalized intersection.

• 16% of project related trips were distrusted/assigned along the southern portion of Manono Street, which later continues as Kawili Street. This roadway may likely be used by students at the University of Hawaii at Hilo, located on Kawili Street, as well as by some residents in the single-family homes located south of Puainako Street.

Figure 13 shows the forecasted project related trips at the study intersections during the AM and PM peak hours which are expected to align with the calculated trips and proposed uses of the development.

# (3) Modal Choice

To assume the worst-case conditions for traffic, all project related external trips were assumed to be by private vehicle only, as opposed to considering some trips be taken by foot, bike, or bus. This aligns with the limited multimodal infrastructure and limited transit use in the area.

# E. Future With Project Volumes

Future With Project conditions were calculated through the following methods:

- Future (2027) With Project (see Figure 14) is a sum of Future (2027) Without Project (see Figure 10) and the additional site generated trips expected to be produced by the development (see Figure 13).
- Future (2032) With Project (See Figure 15) is a sum of Future (2032) Without Project (see Figure 11) and the additional site generated trips expected to be produced by the development (see Figure 13).
- Future (2042) With Project (See Figure 16) is a sum of Future (2042) Without Project (see Figure 12) and the additional site generated trips expected to be produced by the development (see Figure 13).



Figure 13: Kanaka Beverage & Cafe Project Related Trips


Figure 14: Future (2027) With Project Peak Hour Volumes



Figure 15: Future (2032) With Project Peak Hour Volumes



Figure 16: Future (2042) With Project Peak Hour Volumes

#### 1. Future (2027) With Project Conditions

Future (2027) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 16 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Future (2027) With Project conditions can be found in Appendix F.

		AM		PM		
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	20.4	-	С	24.3	-	С
Hawaii Route 19 EB Left	13.2	0.28	В	15.7	0.29	В
Hawaii Route 19 EB Through	15.9	0.38	В	20.5	0.47	С
Hawaii Route 19 EB Right	19.7	0.54	В	29.8	0.74	С
Hawaii Route 19 WB Left	12.1	0.18	В	15.5	0.23	В
Hawaii Route 19 WB Through	18.7	0.56	В	21.4	0.51	С
Hawaii Route 19 WB Right	13.2	0.02	В	16.2	0.02	В
Manono Street NB Left	27.6	0.65	С	27.1	0.73	С
Manono Street NB Through-Right	25.5	0.37	С	22.1	0.22	С
Lihiwai Street SB Left	26.8	0.08	С	28.1	0.08	С
Lihiwai Street SB Through-Right	36.0	0.74	D	38.1	0.77	D
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Hawaii Route 11 NB Left	22.6	0.57	С	22.2	0.41	С
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	25.3	0.34	D	23.4	0.44	С
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Manono Street NB Left-Through-Right	8.3	0.03	А	8.3	0.01	А
Manono Street SB Left-Through-Right	8.1	0.05	А	8.2	0.07	А
Piilani Street EB Left-Through-Right	32.6	0.42	D	27.6	0.32	D
Piilani Street WB Left-Through-Right	26.5	0.53	D	25.5	0.49	D
Manono Street & Kekuanaoa Street	32.0	-	С	31.4	-	С
Manono Street NB Left	20.7	0.25	С	19.9	0.15	В
Manono Street NB Through-Right	30.9	0.65	С	27.0	0.50	С
Manono Street SB Left	21 5	0.07	·	20.4	0.25	C
Manono Street SB Through-Right	21.5	0.27	Ĺ	20.1	0.25	C
	29.0	0.27	C C	31.1	0.25	C
Kekuanaoa Street EB Left	29.0 27.5	0.27	C C C	20.1 31.1 23.2	0.23	C C
Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right	29.0 27.5 29.3	0.27 0.58 0.44 0.60	C C C C	20.1 31.1 23.2 40.1	0.25 0.66 0.37 0.83	C C D
Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left	21.3 29.0 27.5 29.3 18.8	0.27 0.58 0.44 0.60 0.08	C C C B	20.1 31.1 23.2 40.1 25.8	0.25 0.66 0.37 0.83 0.40	C C D C
Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right	21.3 29.0 27.5 29.3 18.8 42.0	0.27 0.58 0.44 0.60 0.08 0.85	C C C B D	20.1 31.1 23.2 40.1 25.8 31.9	0.25 0.66 0.37 0.83 0.40 0.68	C C D C C
Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street	29.0 27.5 29.3 18.8 42.0 Unsi	0.27 0.58 0.44 0.60 0.08 0.85 gnalized (TV	C C C B D VSC)	20.1 31.1 23.2 40.1 25.8 31.9 Unsi	0.25 0.66 0.37 0.83 0.40 0.68 gnalized (TV	C C D C C VSC)
Kekuanaoa Street EB Left         Kekuanaoa Street EB Through-Right         Kekuanaoa Street WB Left         Kekuanaoa Street WB Through-Right         Mililani Street & Kekuanaoa Street         Mililani Street NB Left-Through-Right	29.0 27.5 29.3 18.8 42.0 Unsi 25.4	0.27 0.58 0.44 0.60 0.08 0.85 gnalized (TV 0.15	C C C B D VSC)	20.1 31.1 23.2 40.1 25.8 31.9 Unsi 17.0	0.25 0.66 0.37 0.83 0.40 0.68 gnalized (TV 0.09	C C D C C VSC)
Kekuanaoa Street EB Left         Kekuanaoa Street EB Through-Right         Kekuanaoa Street WB Left         Kekuanaoa Street WB Through-Right         Mililani Street & Kekuanaoa Street         Mililani Street NB Left-Through-Right         Mililani Street SB Left-Through-Right	29.0 27.5 29.3 18.8 42.0 Unsi 25.4 18.5	0.27 0.58 0.44 0.60 0.08 0.85 gnalized (TV 0.15 0.18	C C C B D VSC) C	20.1 31.1 23.2 40.1 25.8 31.9 Unsi 17.0 13.2	0.25 0.66 0.37 0.83 0.40 0.68 gnalized (TV 0.09 0.13	C C D C C VSC) C B
Kekuanaoa Street EB Left         Kekuanaoa Street EB Through-Right         Kekuanaoa Street WB Left         Kekuanaoa Street WB Through-Right         Mililani Street & Kekuanaoa Street         Mililani Street NB Left-Through-Right         Mililani Street SB Left-Through-Right         Kekuanaoa Street EB Left-Through-Right	29.0 27.5 29.3 18.8 42.0 Unsi 25.4 18.5 9.0	0.27 0.58 0.44 0.60 0.08 0.85 gnalized (TV 0.15 0.18 0.03	C C C B D VSC) D C A	20.1 31.1 23.2 40.1 25.8 31.9 Unsi 17.0 13.2 8.5	0.23 0.66 0.37 0.83 0.40 0.68 gnalized (TV 0.09 0.13 0.02	C C D C C VSC) C B A

Table 16: Future	(2027)	With Project	Conditions
------------------	--------	--------------	------------

# (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (3) Manono Street & Piilani Street

All movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# 2. Future (2027) With Project Mitigation

No further mitigation is needed at any intersection for the Future (2027) With Project Conditions.

# 3. Future (2032) With Project Conditions

Future (2032) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. Table 17 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or v/c  $\geq$  1.0 are highlighted in yellow. Synchro reports for the Future (2032) With Project Conditions can be found in Appendix F.

# (1) Hawaii Route 19 at Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (2) Hawaii Route 11 & Piilani Street

All movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

		AM			PM	
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	21.3	-	С	25.4	-	С
Hawaii Route 19 EB Left	14.1	0.31	В	16.4	0.31	В
Hawaii Route 19 EB Through	16.8	0.41	В	21.4	0.51	С
Hawaii Route 19 EB Right	21.2	0.58	С	33.3	0.79	С
Hawaii Route 19 WB Left	12.7	0.19	В	16.0	0.25	В
Hawaii Route 19 WB Through	20.0	0.61	В	22.3	0.55	С
Hawaii Route 19 WB Right	13.7	0.02	В	16.6	0.02	В
Manono Street NB Left	27.8	0.66	С	27.5	0.75	С
Manono Street NB Through-Right	25.1	0.35	С	21.9	0.22	С
Lihiwai Street SB Left	27.3	0.08	С	28.4	0.08	С
Lihiwai Street SB Through-Right	36.6	0.75	D	38.6	0.77	D
Hawaii Route 11 & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Hawaii Route 11 NB Left	25.0	0.61	D	24.6	0.45	С
Hawaii Route 11 NB Through	-	-	-	-	-	-
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	30.2	0.40	D	25.9	0.48	D
Manono Street & Piilani Street	Unsi	gnalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Manono Street NB Left-Through-Right	8.3	0.03	А	8.3	0.01	А
Manono Street SB Left-Through-Right	8.2	0.05	А	8.2	0.07	А
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D
Manono Street & Kekuanaoa Street	33.7	-	С	33.2	-	С
Manono Street NB Left						
	22.1	0.27	С	21.2	0.17	С
Manono Street NB Through-Right	22.1 33.9	0.27 0.71	C C	21.2 28.7	0.17 0.55	C C
Manono Street NB Through-Right Manono Street SB Left	22.1 33.9 23.0	0.27 0.71 0.30	C C C	21.2 28.7 21.2	0.17 0.55 0.27	C C C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right	22.1 33.9 23.0 31.6	0.27 0.71 0.30 0.65	C C C C	21.2 28.7 21.2 34.7	0.17 0.55 0.27 0.73	C C C C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left	22.1 33.9 23.0 31.6 28.0	0.27 0.71 0.30 0.65 0.46	C C C C C	21.2 28.7 21.2 34.7 22.9	0.17 0.55 0.27 0.73 0.37	C C C C C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right	22.1 33.9 23.0 31.6 28.0 29.3	0.27 0.71 0.30 0.65 0.46 0.63	C C C C C C	21.2 28.7 21.2 34.7 22.9 42.4	0.17 0.55 0.27 0.73 0.37 0.87	C C C C C D
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left	22.1 33.9 23.0 31.6 28.0 29.3 18.5	0.27 0.71 0.30 0.65 0.46 0.63 0.09	C C C C C C B	21.2 28.7 21.2 34.7 22.9 42.4 26.5	0.17 0.55 0.27 0.73 0.37 0.87 0.42	C C C C D C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right	22.1 33.9 23.0 31.6 28.0 29.3 18.5 43.4	0.27 0.71 0.30 0.65 0.46 0.63 0.09 0.88	C C C C C C B D	21.2 28.7 21.2 34.7 22.9 42.4 26.5 31.8	0.17 0.55 0.27 0.73 0.37 0.87 0.42 0.70	C C C C C D C C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street	22.1 33.9 23.0 31.6 28.0 29.3 18.5 43.4 Unsi	0.27 0.71 0.30 0.65 0.46 0.63 0.09 0.88 gnalized (TV	C C C C C B D VSC)	21.2 28.7 21.2 34.7 22.9 42.4 26.5 31.8 Unsi	0.17 0.55 0.27 0.73 0.37 0.87 0.42 0.70 gnalized (TV	C C C C C D C C C VSC)
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street NB Left-Through-Right	22.1 33.9 23.0 31.6 28.0 29.3 18.5 43.4 Unsi 27.9	0.27 0.71 0.30 0.65 0.46 0.63 0.09 0.88 gnalized (TV 0.17	C C C C C C B D VSC) D	21.2 28.7 21.2 34.7 22.9 42.4 26.5 31.8 Unsi 18.0	0.17 0.55 0.27 0.73 0.37 0.87 0.42 0.70 gnalized (TV 0.09	C C C C D C C VSC) C
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street SB Left-Through-Right Mililani Street SB Left-Through-Right	22.1 33.9 23.0 31.6 28.0 29.3 18.5 43.4 Unsi 27.9 19.7	0.27 0.71 0.30 0.65 0.46 0.63 0.09 0.88 gnalized (TV 0.17 0.19	C C C C C C B D VSC) D C	21.2 28.7 21.2 34.7 22.9 42.4 26.5 31.8 Unsi 18.0 13.6	0.17 0.55 0.27 0.73 0.37 0.87 0.42 0.70 gnalized (TV 0.09 0.13	C C C C C D C C VSC) C B
Manono Street NB Through-Right Manono Street SB Left Manono Street SB Through-Right Kekuanaoa Street EB Left Kekuanaoa Street EB Through-Right Kekuanaoa Street WB Left Kekuanaoa Street WB Through-Right Mililani Street & Kekuanaoa Street Mililani Street NB Left-Through-Right Mililani Street SB Left-Through-Right Kekuanaoa Street EB Left-Through-Right	22.1 33.9 23.0 31.6 28.0 29.3 18.5 43.4 27.9 19.7 9.1	0.27 0.71 0.30 0.65 0.46 0.63 0.09 0.88 gnalized (TV 0.17 0.19 0.03	C C C C C C B D VSC) D C A	21.2 28.7 21.2 34.7 22.9 42.4 26.5 31.8 Unsi 18.0 13.6 8.6	0.17 0.55 0.27 0.73 0.37 0.87 0.42 0.70 gnalized (TV 0.09 0.13 0.02	C C C C C C C VSC) C B A

Table 17: Future	(2032)	With Proj	ect Conditions
------------------	--------	-----------	----------------

# (3) Manono Street & Piilani Street

At the unsignalized intersection of Manono Street and Piilani Street, the EB left-through-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.46). With increased traffic volumes along Manono Street due to forecasted background growth, LOS will deteriorate compared to the previously analysis year, Future (2027) With Project conditions. All other movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### 4. Future (2032) With Project Mitigation

Potential mitigation was considered at Manono Street and Piilani Street for the Future (2032) With Project conditions.

#### (1) Manono Street & Piilani Street

# (i) Traffic Signal

The *Manual on Uniform Traffic Control Devices* (*MUTCD*) (FHWA, 2009) was used to perform a traffic signal warrant analysis at the intersection. The *MUTCD* states that a traffic control signal should not be installed unless one or more of these warrants are met. However, it also states that, "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control system."

The *MUTCD* states that the Peak Hour Traffic Signal Warrant is only applicable at locations such as at a factory or school where shift changes or school hours cause a significant amount of traffic over a short period of time. It is not assumed that traffic volumes needed for the Eight-Hour and Four-Hour Traffic Signal warrants can be accurately forecasted to determine future traffic volumes in a manner similar to future peak hour traffic volumes. Therefore, the Peak Hour Traffic Signal Warrant was the only warrant available for a future analysis. To satisfy this warrant and merit the consideration of installing a traffic control signal, volume thresholds must fall above the applicable curve for any of the three peak hours throughout the day. Note that for this intersection, the lower curve (1 Lane & 1 Lane) was used for analysis.

Table 18 shows the approach traffic volumes used for analysis at Manono Street and Piilani Street. After plotting the corresponding traffic volumes, neither peak hour fell above the minimum (see Figure 17). Therefore, a traffic signal installation at the intersection of Manono Street and Piilani Street was not deemed appropriate at this time.

	Pilidili St	reet	
N	lanono Street at	Piilani Street	
Time	Major Approach Volume	Minor Approach Volume	Pass Peak- Hour Warrant?
7:30 - 8:30 AM	779	218	No
3:45 - 4:45 PM	889	196	No

# Table 18: Peak Hour Warrant Analysis for Future (2032) With Project Conditions at Manono Street and Piilani Street



Figure 17: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2032 With Project)

#### (ii) All-Way Stop Control

Conversion of a TWSC intersection to All-Way Stop Control (AWSC) will reduce delay on the minor-street stop-controlled approaches; however, it will introduce additional delay along the major-street that would not be present in existing TWSC conditions.

The *MUTCD* provides criteria for implementing AWSC at an intersection, which are shown below, along with their applicability:

- Minimum volumes:
  - 1) The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vph for any 8 hours of an average day; and
  - 2) The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour; but
  - 3) If the 85th-percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the values provided in the previous two statements. (*It is not assumed that Existing (2022) traffic volumes can be accurately forecasted with background growth rate to determine future traffic volumes in a manner similar to future peak hour traffic volumes. As a result, this analysis was only done using the Future (2032) With Project peak hour volumes, as shown in Figure 15. As seen in Table 19, the vehicular volume entering the intersection from the major street approaches averaged over 300 vph, and the minor street combined vehicular, pedestrian, and bicycle volume averaged at least 200 units over both peak hours. Therefore, the minimum volume criteria for implementing AWSC at the intersection was met when averaging the AM and PM peak hours.)*

Time	Major Street Approach Volume	Minor Street Approach Volume
7:30 AM - 8:30 AM	779	218
4:00 PM - 5:00 PM	889	196
Hourly Average Volume	834	207

#### Table 19: Manono Street and Piilani Street Future (2032) With Project Peak Hour Volumes

Table 20 shows the intersection results of Manono Street and Piilani Street as it would operate under AWSC. The EB left-through-right lane improved from LOS E (v/c ratio of 0.46) in its existing TWSC configuration to LOS B (v/c ratio of 0.18) in the AWSC configuration during the AM peak hour. All movements resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

 Table 20: Manono Street and Piilani Street Future (2032) With Project Intersection Operations

		AM		PM		
TWSC (Existing Configuration)	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	Unsi	ignalized (TV	VSC)	Unsignalized (TWSC)		
Manono Street NB Left-Through-Right	8.3	0.03	А	8.3	0.01	А
Manono Street SB Left-Through-Right	8.2	0.05	А	8.2	0.07	А
Piilani Street EB Left-Through-Right	36.3	0.46	E	29.8	0.34	D
Piilani Street WB Left-Through-Right	29.3	0.57	D	27.7	0.51	D
		AM			PM	
AWSC	Delay (sec/veh)	AM v/c	LOS	Delay (sec/veh)	PM v/c	LOS
AWSC Manono Street & Piilani Street	Delay (sec/veh) Unsi	AM v/c ignalized (TV	LOS VSC)	Delay (sec/veh) Unsi	PM v/c gnalized (TV	LOS VSC)
AWSC Manono Street & Piilani Street Manono Street NB Left-Through-Right	Delay (sec/veh) Unsi 15.5	AM v/c gnalized (TV 0.57	LOS VSC) C	Delay (sec/veh) Unsi 16.7	PM v/c gnalized (TV 0.61	LOS VSC) C
AWSC Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right	Delay (sec/veh) Unsi 15.5 22.3	AM v/c gnalized (TV 0.57 0.74	LOS VSC) C C	Delay (sec/veh) Unsi 16.7 30.6	PM v/c gnalized (TV 0.61 0.85	LOS VSC) C D
AWSC Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right Piilani Street EB Left-Through-Right	Delay (sec/veh) Unsi 15.5 22.3 11.4	AM v/c gnalized (TV 0.57 0.74 0.18	LOS VSC) C C B	Delay (sec/veh) Unsi 16.7 30.6 11.3	PM v/c gnalized (TV 0.61 0.85 0.17	LOS VSC) C D B

By Future (2032) With Project conditions, it is recommended to consider reconfiguring the intersection of Manono Street and Piilani Street to AWSC to mitigate excessive delay on the uncontrolled Piilani Street approaches.

# 5. Future (2042) With Project Conditions

Future (2042) With Project LOS and delay were determined for the AM and PM peak hours using *Synchro 10* traffic analysis software. The intersection of Manono Street and Piilani Street was analyzed under AWSC conditions, as recommended and discussed in the Future (2032) With Project conditions. Additionally, the lane reconfiguration mitigative measures at Manono Street and Kekuanaoa Street discussed in the Future (2042) Without Project analysis were assumed to be implemented by this time, and the following results are based off this preferred configuration. Table 21 shows the existing vehicular delay and LOS at each intersection, with the shaded rows indicating the overall intersection delay (applicable at signalized intersections only). Movements that operated at LOS E/F or  $v/c \ge 1.0$  are highlighted in yellow. Synchro reports for the Future (2042) With Project conditions can be found in Appendix F.

		AM			PM	
Intersection	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Hawaii Route 19 & Manono Street/Lihiwai Street	23.6	-	С	29.1	-	С
Hawaii Route 19 EB Left	16.3	0.36	В	17.9	0.35	В
Hawaii Route 19 EB Through	18.7	0.48	В	23.5	0.58	С
Hawaii Route 19 EB Right	25.3	0.68	С	45.1	0.90	D
Hawaii Route 19 WB Left	14.0	0.21	В	17.4	0.28	В
Hawaii Route 19 WB Through	23.3	0.71	С	24.7	0.63	С
Hawaii Route 19 WB Right	14.7	0.02	В	17.4	0.02	В
Manono Street NB Left	28.7	0.70	С	29.4	0.78	С
Manono Street NB Through-Right	24.4	0.33	С	21.9	0.21	С
Lihiwai Street SB Left	28.1	0.09	С	29.7	0.08	С
Lihiwai Street SB Through-Right	37.8	0.75	D	40.3	0.78	D
Hawaii Route 11 & Piilani Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Hawaii Route 11 NB Left	32.3	0.69	D	31.7	0.53	D
Hawaii Route 11 NB Through	-	-	-	-		
Hawaii Route 11 SB Through-Right	-	-	-	-	-	-
Piilani Street EB Left-Right	44.2	0.51	E	34.7	0.57	D
Manono Street & Piilani Street	Unsi	gnalized (AV	NSC)	Unsi	gnalized (AV	VSC)
Manono Street NB Left-Through-Right	20.8	0.69	С	19.5	0.67	С
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E
Piilani Street EB Left-Through-Right	12.3	0.20	В	11.4	0.15	В
Piilani Street WB Left-Through-Right	13.6	0.36	В	12.5	0.30	В
Manono Street & Kekuanaoa Street	36.6	-	D	34.4	-	С
Manono Street NB Left	24.4	0.32	С	23.6	0.21	С
Manono Street NB Through-Right	40.9	0.81	D	31.7	0.63	С
Manono Street SB Left	25.7	0.35	С	22.8	0.30	С
Manono Street SB Through-Right	37.0	0.75	D	44.8	0.86	D
Kekuanaoa Street EB Left	29.1	0.49	С	22.2	0.37	С
Kekuanaoa Street EB Through	29.1	0.65	С	40.2	0.86	D
Kekuanaoa Street EB Right	19.3	0.06	В	19.9	0.11	В
Kekuanaoa Street WB Left	18.1	0.09	В	25.9	0.42	С
Kekuanaoa Street WB Through	45.7	0.91	D	30.4	0.69	С
Kekuanaoa Street WB Right	19.2	0.05	В	19.4	0.07	В
Mililani Street & Kekuanaoa Street	Unsi	ignalized (TV	VSC)	Unsi	gnalized (TV	VSC)
Mililani Street NB Left-Through-Right	34.7	0.21	D	20.6	0.11	С
Mililani Street SB Left-Through-Right	22.9	0.22	С	14.5	0.14	В
Kekuanaoa Street EB Left-Through-Right	9.4	0.03	Α	8.8	0.02	А
Kekuanaoa Street WB Left-Through-Right	8.7	0.01	А	9.1	0.01	А

Table 21: Future	(2042)	With Proj	ject Conditions
------------------	--------	-----------	-----------------

#### (1) Hawaii Route 19 & Manono Street/Lihiwai Street

The intersection and all movements at the signalized intersection of Hawaii Route 19 and Manono Street/Lihiwai Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

#### (2) Hawaii Route 11 & Piilani Street

At the unsignalized intersection of Hawaii Route 11 and Piilani Street, the EB left-right lane will operate poorly at LOS E during the AM peak hour (v/c ratio of 0.51). With increased traffic volumes along Hawaii

Route 11 due to forecasted background growth, LOS will deteriorate compared to the previous analysis year, Future (2032) With Project conditions. All other movements at the unsignalized intersection of Hawaii Route 11 and Piilani Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (3) Manono Street & Piilani Street

At the unsignalized intersection of Manono Street and Piilani Street, even after implementation of AWSC as recommended in the Future (2032) With Project analysis, the SB left-through-right lane will operate poorly at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively). With increased traffic volumes along Manono Street due to forecasted background growth, LOS will deteriorate compared to the previous analysis year, Future (2032) With Project conditions. All other movements at the unsignalized intersection of Manono Street and Piilani Street resulted in appropriate LOS C or better and v/c < 1.0 during the AM and PM peak hours.

# (4) Manono Street & Kekuanaoa Street

The intersection and all movements at the signalized intersection of Manono Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# (5) Mililani Street & Kekuanaoa Street

All movements at the unsignalized intersection of Mililani Street and Kekuanaoa Street resulted in appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours.

# 6. Future (2042) With Project Mitigation

Potential mitigation was considered at Hawaii Route 11 and Piilani Street and at Manono Street and Piilani Street for the Future (2042) With Project conditions.

# (1) Hawaii Route 11 & Piilani Street

Although the shared EB left-right lane at Hawaii Route 11 and Piilani Street is projected to operate poorly at LOS E (v/c ratio of 0.51) during the AM peak hour, traffic volumes along Piilani Street are not expected to significantly change from the previous analysis year, Future (2032) With Project conditions. However, EB left-turning movements at the intersection will experience higher overall delay, needing to find gaps in the SB traffic to cross three lanes, compared to EB right-turning movements, who only need to find gaps in the SB traffic to cross the nearest lane. EB left-turning volumes at the intersection are extremely low, with only 13 vehicles making this movement in the AM peak hour and 8 making it in the PM peak hour. The mainline movements along Hawaii Route 11 make up the majority of the intersection volume, all which operate at appropriate LOS D or better and v/c < 1.0 during the AM and PM peak hours. Additionally, the shared EB left-right lane is not approaching capacity, with a v/c ratio of only 0.51 during the AM peak hour, and 0.57 during the PM peak hour. It is recommended to monitor the intersection, but no mitigation is deemed appropriate at this time.

# (2) Manono Street & Piilani Street

# (i) Traffic Signal

The MUTCD was used to perform a traffic signal warrant analysis at the intersection of Manono Street and Piilani Street, similar to the analysis performed in the Future (2032) With Project conditions. Table 22

shows the approach traffic volumes used for analysis at Manono Street and Piilani Street. After plotting the corresponding traffic volumes, neither peak hour fell above the minimum threshold (1 Lane & 1 Lane) (see Figure 18). Therefore, a traffic signal installation at the intersection of Manono Street and Piilani Street was not deemed appropriate at this time. It is recommended to monitor the intersection, take future traffic counts, and re-run a traffic signal warrant (either an Eight-Hour or Four-Hour Warrant) into the future.

	Filialii St	ieet	
M	lanono Street at	Piilani Street	
Time	Major Approach Volume	Minor Approach Volume	Pass Peak- Hour Warrant?
7:30 - 8:30 AM	855	218	No
3:45 - 4:45 PM	987	196	No

Table 22: Peak Hour Warrant Analysis for Future (2042) With Project Conditions at Manono Street and
Piilani Street



Figure 18: Peak Hour Volume Thresholds at Manono Street and Piilani Street (2042 With Project)

#### (ii) Mini-Roundabout

Mini-roundabouts share many commonalities as standard roundabouts in terms of their operational efficiency, intersection safety benefits, and traffic calming tendencies; however, unlike standard roundabouts, mini-roundabouts have a much more compact size, allowing them to be implemented at smaller intersections where there may be insufficient room for a standard roundabout. Additionally, the

center island within a mini-roundabout is typically fully traversable, allowing large heavy-vehicles to navigate the intersection without damaging the installation. FHWA released a technical summary on *Mini Roundabouts* (FHWA, 2010) detailing the benefits and constraints of mini-roundabouts, which can be seen in Table 23.

Benefit	Description and Constraining Factors
	A mini-roundabout can often be developed to fit within existing right-
	of-way constraints. Note that mini-roundabouts are generally not
Compact Size	recommended for intersections with more than four legs. However, in
	some cases there may be adequate spacing between legs to allow for
	two closely-spaced mini-roundabouts.
	A mini-roundabout may provide less delay for a critical movement or
	for an overall intersection in comparison to other intersection
Operational Efficiency	alternatives. However, as with all roundabout types, mini-roundabouts
	do not provide explicit priority to specific users such as trains, transit, or
	emergency vehicles.
	Mini-roundabouts have been used successfully in the U.K. to improve
Traffic Safaty	safety at intersections with known crash problems, with reported crash
Traine Salety	rate reductions of approximately 30 percent as compared to signalized
	intersections.
	Designed properly, a mini-roundabout reduces speeds and can be
	implemented as part of a broader traffic calming scheme. The low-
Traffic Calming	speed environment also enhances the intersection for non-motorized
frame canning	users. However, mini-roundabouts cannot provide the same level of
	speed reduction as their larger counterparts and thus are less suited for
	roadways with speeds exceeding 30 to 35 mph (50 to 55 km/h).
	A mini-roundabout can be used to provide efficient access to a new or
	existing development. However, in the cases of large trucks and other
Access Management	large vehicles, the diameter may be too small to accommodate U-turn
	maneuvers that would be readily accommodated at a larger
	roundabout.
	In comparison to full-size roundabouts, mini-roundabouts do not allow
Aasthatics	opportunities for landscaping in the central island. As with comparably
Aesthetics	sized traditional intersections, landscaping opportunities are limited to
	the periphery of the intersection.
	A mini-roundabout may offer an environmental benefit compared to
Environmental Benefits	conventional intersections through reduced delay, fuel consumption,
	and vehicle emissions.
*Source: Mini-Rounda	bouts Technical Summary (FHWA, 2010)

Operationally, FHWA recommends mini-roundabouts for intersections with total entering volumes no greater than 1,600 vehicles/hour (vph). Peak hour volumes at the Manono Street and Piilani Street intersection during the Future (2042) With Project conditions are 1,073 and 1,183 during the AM and PM peak hours, respectively, both considerably below the recommended hourly capacity.

At mini-roundabouts, the inscribed circular diameter (ICD), or the diagonally measured distance between the corners of the intersection, is typically between 50 to 80 feet, while the central island is between 16 to 45 feet in diameter. The existing diagonal measurement between TMK parcels is approximately 65-70 feet with approximately 60 feet of paved travelway. This is an adequate width to reconfigure as a miniroundabout with a 5 feet shoulder on all sides. A conceptual rendering of a mini-roundabout at this intersection can be seen in Figure 19.



Figure 19: Conceptual Mini-Roundabout at Manono Street and Piilani Street

Mini-roundabouts have been implemented elsewhere on Hawaii island, including one at Halekii Street and Mamao Street in Kealakekua (see Figure 20).



Figure 20: Mini Roundabout at Halekii Street and Mamao Street in Kealakekua

Table 24 shows the intersection of Manono Street and Piilani Street as it would operate with a miniroundabout. The SB left-through-right lane will improve from LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively) in AWSC configuration (recommended to be implemented in Future (2032) With Project) to LOS A in the mini-roundabout configuration. All movements resulted in appropriate LOS A and v/c < 1.0 during the AM and PM peak hours. Synchro reports for the Future (2042) With Project mitigation can be found in Appendix G.

		AM			PM	
AWSC (Proposed in Future [2032] With Project)	Delay (sec/veh)	v/c	LOS	Delay (sec/veh)	v/c	LOS
Manono Street & Piilani Street	Unsi	gnalized (A\	VSC)	Unsi	gnalized (AV	NSC)
Manono Street NB Left-Through-Right	20.8	0.69	С	19.5	0.67	С
Manono Street SB Left-Through-Right	39.8	0.89	E	43.6	0.94	E
Piilani Street EB Left-Through-Right	12.3	0.20	В	11.4	0.15	В
Piilani Street WB Left-Through-Right	13.6	0.36	В	12.5	0.30	В
		AM			PM	
Mini-Roundabout	Delay (sec/veh)	AM v/c	LOS	Delay (sec/veh)	PM v/c	LOS
Mini-Roundabout Manono Street & Piilani Street	Delay (sec/veh) 7.0	AM v/c -	LOS A	Delay (sec/veh) 7.0	PM v/c -	LOS A
Mini-Roundabout Manono Street & Piilani Street Manono Street NB Left-Through-Right	Delay (sec/veh) 7.0 7.0	AM v/c - 0.37	LOS A A	Delay (sec/veh) 7.0 6.0	PM v/c - 0.36	LOS A A
Mini-Roundabout Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right	Delay (sec/veh) 7.0 7.0 8.0	AM v/c - 0.37 0.48	LOS A A A	Delay (sec/veh) 7.0 6.0 8.0	PM v/c - 0.36 0.50	LOS A A A
Mini-Roundabout Manono Street & Piilani Street Manono Street NB Left-Through-Right Manono Street SB Left-Through-Right Piilani Street EB Left-Through-Right	Delay (sec/veh) 7.0 7.0 8.0 6.0	AM v/c - 0.37 0.48 0.14	LOS A A A A	Delay (sec/veh) 7.0 6.0 8.0 6.0	PM v/c - 0.36 0.50 0.10	LOS A A A A

Table 24: Manono Street and Piilani Street Future (2042) With Project Intersection Operations

By Future (2042) With Project conditions, it is recommended to consider reconfiguring the intersection of Manono Street and Piilani Street to a mini-roundabout. Alternatively, it is recommended to take traffic counts and monitor the intersection into the future for potential signal warrants passing.

# V. SUMMARY AND RECOMMENDATIONS

Hawaiian Kingdom Brands is proposing to construct an approximately 30,000 square-foot (sf) beverage bottling plant, 1,800 sf casual full-service restaurant with drive-through, and an 81-stall surface parkinglot on a vacant lot in the NE corner of Mililani Street and Piilani Street in Hilo on the island of Hawaii. At the location of the proposed development, Mililani Street and the road north of the project are undeveloped. The development is anticipated to generate trips from a mix of employees, deliveries, as well as customers for the sit-down restaurant and drive-through. Construction is anticipated to begin by early 2023, with completion expected by early 2024.

This TIAR analyzed traffic conditions for the Existing (2022) conditions, as well as Future Without and Future With Project conditions corresponding to five (2027), ten (2032), and twenty (2042) years into the future. Anticipated future traffic growth and trips resulting from surrounding area development were included in Future Without as well as the Future With conditions. Additionally, the *ITE Trip Generation*, *11<sup>th</sup> Edition* was used to determine the number of project generated trips expected based on the development size. Five study intersections which projected to add 3% or greater traffic to their forecasted volumes were analyzed, per HDOT standard practice.

In the Existing (2022) conditions, all intersections and individual lane movements operate with appropriate LOS D or better during the AM and PM peak hours. Similarly, all intersections and individual lane movements are projected to operate with appropriate LOS D or better during the AM and PM peak hours for the Future (2027) and Future (2032) Without Project conditions.

Concurrent with the Future (2042) Without Project conditions, it is projected that the EB through-right lane at Manono Street and Kekuanaoa Street will operate at LOS E during PM peak hour (v/c ratio of 0.97). With excess roadway width present at the intersection, it is recommended to consider reconfiguring both the EB and WB approaches to include 10-11 foot wide separated right turn lanes, allowing the existing through-right lanes to be converted to through-only lanes. In doing so, the intersection capacity will increase, improving the LOS for the EB through-right lane to an acceptable manner.

Concurrent with the Future (2032) With Project conditions, it is projected that the EB left-through-right lane at Manono Street and Piilani Street will operate at LOS E during the AM peak hour (v/c ratio of 0.46). A *MUTCD* Peak Hour traffic signal warrant was analyzed at the intersection but did not pass. Additionally, the intersection was analyzed under AWSC, where the intersection met minimum *MUTCD* volume thresholds averaged over the AM and PM peak hours. It is therefore recommended to consider reconfiguring the intersection to AWSC, which will result in acceptable LOS for all intersection movements.

Concurrent with the Future (2042) With Project conditions, it is project that the EB left-right lane at Hawaii Route 11 and Piilani Street will operate at LOS E during the AM peak hour (v/c ratio of 0.51). However, all mainline movements along Hawaii Route 11, which make up the majority of the intersection volume, will operate at appropriate LOS. The EB volume at the intersection is extremely low, particularly in in the EB left-turning direction, which will tend to have a higher delay than EB right-turning vehicles. The EB leftright lane is not approaching capacity. It is recommended to monitor the intersection, but no mitigation is deemed appropriate. Concurrent with the Future (2042) With Project conditions, it is projected that the SB left-through-right lane at Manono Street and Piilani Street will operate at LOS E during the AM and PM peak hours (v/c ratio of 0.89 and 0.94, respectively), even after reconfiguring the AWSC, as recommended in the Future (2032) With Project conditions. A *MUTCD* Peak Hour traffic signal warrant was analyzed at the intersection but did not pass. Alternatively, the intersection was analyzed as a mini-roundabout, which shares many commonalities with standard roundabouts in terms of operational efficiency, intersection safety, and traffic calming, yet can be implemented at smaller intersections such as Manono Street and Piilani Street. Peak hour intersection volumes at the intersection are projected to be considerably below the FHWA recommended hourly capacity of a mini-roundabout. Alternatively, it is recommended to take traffic counts and monitor the intersection into the future for potential signal warrants passing.

# VI. REFERENCES

AECOM, Traffic Impact Analysis Report Hale Ola o Mohouli Affordable Residential Development (2020).

C.H.M.H.I.L.L. (2012). Federal - Aid Functional Classification Update: Policy and Procedures. State of Hawaii Department of Transportation Highways Division Planning Branch.

County of Hawaii. Hele-On Bus, < http://www.heleonbus.org/>

County of Hawaii, Street Design Manual (October 2020).

Federal Highway Administration. 2018 Highway Performance Monitoring System, https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fgeo.dot.gov%2Fserver %2Frest%2Fservices%2FHosted%2FHawaii\_2018\_PR%2FFeatureServer&source=sd

Federal Highway Administration. *Manual on Uniform Traffic Control Devices* (2009 Edition).

- Federal Highway Administration. *Mini-Roundabouts Technical Summary* (February 2010)
- Institute of Transportation Engineers. *Trip Generation, 11th Edition: An ITE Informational Report,* September 2021.
- Office of Environmental Quality Control (OEQC). *EA and EIS Online Library*, Accessed 2022, <a href="http://oeqc.doh.Hawaii.gov/default.aspx>">http://oeqc.doh.Hawaii.gov/default.aspx></a>.
- SSFM International, Traffic Impact Analysis Report Bank of Hawaii (2018).
- SSFM International, Traffic Impact Analysis Report Hilo Iron Works (2019).
- State of Hawaii, Department of Transportation. *Federal-Aid Highways 2035 Transportation Plan for the District of Hawaii*, July 2014.

State of Hawaii, Department of Transportation. *Historical Traffic Station Maps*.

- State of Hawaii, Department of Transportation. *Statewide Transportation Improvements Program*, FY 2019-2022 <a href="http://Hawaii.gov/dot/highways/STIP">http://Hawaii.gov/dot/highways/STIP</a>.
- Transportation Research Board, National Research Council. Highway Capacity Manual, Washington, D.C., 2010 Edition.
- Transportation Research Board, National Research Council. Highway Capacity Manual, Washington, D.C., 2016 Edition.

Wilson Okamoto Corporation, Traffic Assessment South Hilo Sanitary Landfill (2017).

# Appendix A – Traffic Count Data



Run Date	<b>e:</b> 2014	/05/29		L	liabuo	Ha Divis	waii Depa	artment of	Transp	ortation	i Diama		v Cooti		
				П	iignwa	ys Divis	0012	Drogram	Count	Gumm	s Plani	ling Surve	y Secu	on	
Site ID: B	7127700 al Class	0332 : URBAN	COLLEC	TOR	0.		Town: H Count T	Hawaii Y <b>pe:</b> CLASS	Count	DIR 1:+ Counter	ary MP ⊑ <b>≦Type:</b> ⊺	DIR 2:-MP Tube	Final A Route	ADT: No: 27	10300 70
Location:	Manor	no Street	- Piilani Si	treet to Kuaw	/a St										
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE: 07/	18/2013														
12:00-12:15	7	9	16	06:00-06:15	33	33	66	12:00-12:15	109	114	223	06:00-06:15	32	62	94
12:15-12:30	5	10	15	06:15-06:30	42	43	85	12:15-12:30	108	114	222	06:15-06:30	45	76	121
12:30-12:45	12	8	20	06:30-06:45	30	36	66	12:30-12:45	94	115	209	06:30-06:45	55	63	118
12:45-01:00	6	7	13	06:45-07:00	57	67	124	12:45-01:00	110	116	226	06:45-07:00	39	70	109
01:00-01:15	1	4	5	07:00-07:15	64	51	115	01:00-01:15	108	118	226	07:00-07:15	31	52	83
01:15-01:30	1	2	3	07:15-07:30	71	69	140	01:15-01:30	120	125	245	07:15-07:30	34	55	89
01:30-01:45	5	5	10	07:30-07:45	98	87	185	01:30-01:45	96	101	197	07:30-07:45	27	45	72
01:45-02:00	4	7	11	07:45-08:00	75	84	159	01:45-02:00	84	111	195	07:45-08:00	38	33	71
02:00-02:15	5	9	14	08:00-08:15	/5	79	154	02:00-02:15	85	100	185	08:00-08:15	36	38	74
02:15-02:30	2	2	4	08:15-08:30	83	//	160	02:15-02:30	82	109	191	08:15-08:30	30	28	58
02:30-02:45	2	3	5	08:30-08:45	/6	81	157	02:30-02:45	107	113	220	08:30-08:45	31	42	73
02:45-03:00	4	4	8	08:45-09:00	80	/5	155	02:45-03:00	99	137	236	08:45-09:00	23	20	43
03:00-03:15	4	1	5	09:00-09:15	/0	00	157	03:00-03:15	97	120	223	09:00-09:15	10	20	30
03:15-03:30	2	1	3	09:15-09:30	00 07	80	100	03:15-03:30	01	104	198	09:15-09:30	20	20	30
03.30-03.45	5	4	9	09.30-09.43	07	09	170	03.30-03.45	00	124	207	09.30-09.45	22	29	31
03.45-04.00	0	4	10	10:00 10:15	03	90 70	101	03.45-04.00	117	132	214	10:00 10:15	21	21	42
04:00-04:15	3	4	/	10:00-10:15	8/ 05	/9	100	04:00-04:15	117	134	201	10:00-10:15	23	19	42
04.15-04.30	9	0	9	10:10-10:30	00	00	100	04.15-04.30	90	100	204	10:10-10:30	10	14	23
04:30-04:45	16	3	11	10:30-10:45	00	100	178	04:30-04:45	99 110	138	237	10:30-10:45	13	0	24
04.45-05.00	10	11	23	10.45-11.00	100	120	200	04.45-05.00	04	07	171	10.45-11.00	0	9	10
05:00-05:15	15	11	20	11:00-11:15	109	103	212	05:00-05:15	84 01	87	1/1	11:00-11:15	0 7	11	12
05:15-05:30	17	10	25	11:15-11:30	81	100	199	05:15-05:30	51	92	153	11:15-11:30	/	11	18
05:45-06:00	15 26	16	33 42	11:45-12:00	92 87	120	194	05:45-06:00	53 69	61	130	11:45-12:00	9 7	2	16
		D (05:00-09	-00)	NR 1	י <u>י</u>	R 2					9.00)				
			.00) D								5.00)	BITT		DITZ	
				07:30 AM to	08.30 41/			PM - I				04.00	PM to 05	00 PM	
AM - PE			3	31	32 30	7	658	PM - I				424	0 1 10 00	497	921
AM - K F	FACTOR (S	%)		01	02		6.33	PM - I	< FACTOR	(%)				107	8.86
AM - D (	(%)	,	50	0.30	49	.70	100.00	PM - I	D (%)	()		46.04		53.96	100.00
DIRECTION	AL PEAK							DIRECTIC	NAL PEA	ĸ					
AM - PE	AK HR TIN	1E	0	7:30 AM to 08:30	AM 07	:30 AM to 0	8:30 AM	PM - F	PEAK HR 1			04:00 PM to 05	5:00 PM	03:45 PM t	o 04:45 PM
AM - PE			33	31	32	/		PM - H				424		512	
AM PERIOD (0	J0:00-12:00	0)							(12:00-24	.:00)					
I WO DIREC		EAK						IWODIRI		PEAK					
AM - PE			0	10:45 AM to	11:45 AM	•	005	PM - H				04:00	0 PM to 05	:00 PM	001
			31	65	47	0	835	PIVI - I				424		497	921
	-AUTUR (†	/0)	1	2 71	56	20	100.00			(70)		46.04		52.06	0.00
	(/0)	00 /00 00 :	4	0.71	30	.23	100.00		- ( /0)			-0.04		JJ.30	100.00
NON-COMMU	IER PERI	UD (09:00-1	5:00)					6-HR, 12-H	≺, 24-HK F	ERIODS		UIK1 DI	IK 2	Iotal	
TWO DIREC	TIONAL P	EAK						AM 6-HR	PERIOD (0	06:00-12:00)		1,822 1,9	967	3,789	
PEAK H		_		12:30 PM to	01:30 PN	1		AM 12-HF		(00:00-12:00)	)	2,002 2,	114	4,116	
PEAK H	IR VOLUM	E	43	32	47	4	906	PM 6-HR	PERIOD (1	12:00-18:00)		2,236 2,	717	4,953	
DIRECTION	AL PEAK							PM 12-HF	PERIOD	(12:00-24:00)	)	2,816 3,4	468	6,284	
PEAK H	IR TIME		1:	2:45 PM to 01:45	PM 12	:30 PM to 0	1:30 PM	24 HOUR	PERIOD			4,818 5,5	582	10,400	
PEAK H	IR VOLUN	1E	43	34	47	4		D (%)				46.33 53	3.67	100.00	

Run Date	<b>e:</b> 2014	/05/29		н	liahwa	Ha vs Divis	waii Depa	artment of	Trans	oortation Highway	ı vs Planı	nina Surve	v Secti	on	
						,	2013	Program	Count	- Summ	arv		,	•••	
Site ID: B Functiona Location:	7127700 <b>al Class</b> : Manor	0332 : URBAN: io Street -	:COLLEC - Piilani Si	TOR treet to Kuaw	va St		Town: 1 Count T	Hawaii y <b>pe:</b> CLASS	j	DIR 1:+ Counter	MP [ Type: 7	<b>DIR 2:</b> -MP lube	Final / Route	<b>AADT:</b> <b>No:</b> 27	10300 70
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE: 07/	19/2013														
12:00-12:15	8	9	17	06:00-06:15	22	27	49	12:00-12:15	89	114	203	06:00-06:15	55	68	123
12:15-12:30	6	2	8	06:15-06:30	32	34	66	12:15-12:30	96	111	207	06:15-06:30	78	70	148
12:30-12:45	8	4	12	06:30-06:45	33	42	75	12:30-12:45	122	107	229	06:30-06:45	47	69	116
12:45-01:00	3	5	8	06:45-07:00	47	40	87	12:45-01:00	93	115	208	06:45-07:00	61	59	120
01:00-01:15	6	10	16	07:00-07:15	47	56	103	01:00-01:15	104	116	220	07:00-07:15	56	64	120
01:15-01:30	3	2	5	07:15-07:30	56	58	114	01:15-01:30	96	114	210	07:15-07:30	40	71	111
01:30-01:45	2	5	7	07:30-07:45	81	88	169	01:30-01:45	92	113	205	07:30-07:45	56	73	129
01:45-02:00	3	5	8	07:45-08:00	83	/4	157	01:45-02:00	88	99	187	07:45-08:00	40	49	89
02:00-02:15	0	5	5	08:00-08:15	62	100	139	02:00-02:15	89	111	200	08:00-08:15	39	40	79
02:15-02:30	2	0	2	08:15-08:30	56	100	156	02:15-02:30	98	103	201	08:15-08:30	40	45	85
02:30-02:45	2	4	0	08:30-08:45	80	09	104	02:30-02:45	110	109	193	08:30-08:45	20	30	60 70
02:45-03:00	4	0	4	08:45-09:00	00 07	99	185	02:45-03:00	110	105	215	08:45-09:00	33	43	76
03.00-03.13	1	2	3	09.00-09.15	07	90	177	03.00-03.15	09 74	109	192	09.00-09.13	50	32	00
03:30-03:45	5	1	4	09.15-09.30	72	120	102	03.13-03.30	111	117	228	09.13-09.30	33	40	20 73
03:45-04:00	8	- 0	8	09:45-10:00	84	113	192	03:45-04:00	96	121	220	09:45-10:00	12	30	73
03.43-04.00	6	4	10	10:00-10:15	71	95	166	03.45-04.00	119	121	217	10:00-10:15	33	41	74
04:15-04:30	10	6	16	10:15-10:30	75	91	166	04:15-04:30	98	144	240	10:15-10:30	27	32	59
04:30-04:45	9	7	16	10:30-10:45	73	109	182	04:30-04:45	106	118	224	10:30-10:45	29	23	52
04:45-05:00	9	5	14	10:45-11:00	92	111	203	04:45-05:00	103	136	239	10:45-11:00	40	28	68
05:00-05:15	8	8	16	11:00-11:15	103	104	207	05:00-05:15	107	109	216	11:00-11:15	17	27	44
05:15-05:30	11	13	24	11:15-11:30	112	120	232	05:15-05:30	68	80	148	11:15-11:30	14	23	37
05:30-05:45	18	18	36	11:30-11:45	106	133	239	05:30-05:45	82	99	181	11:30-11:45	19	26	45
05:45-06:00	26	27	53	11:45-12:00	110	95	205	05:45-06:00	67	99	166	11:45-12:00	14	15	29
AM COMMUTE	ER PERIO	D (05:00-09: EAK	.00) D	IR 1	DI	R 2		PM COMML TWO DIR	JTER PER ECTIONAL	IOD (15:00-1 _ PEAK	9:00)	DIR 1		DIR 2	
AM - PE	AK HR TIN	ΛE		08:00 AM to	09:00 AN	I		PM - I	PEAK HR	TIME		04:00	0 PM to 05	5:00 PM	
AM - PE	AK HR VC	LUME	28	39	34	5	634	PM - I	PEAK HR	VOLUME		426		519	945
AM - K F AM - D (	-ACTOR (% (%)	%)	45	5.58	54	.42	5.74 100.00	PM - I PM - I	K FACTOF D (%)	R (%)		45.08		54.92	8.56 100.00
AM - PE	AL PEAK AK HR TIN	IE	30	3:00 AM to 09:00	AM 08	:00 AM to 0	9:00 AM	DIRECTIC PM - F	PEAK HR			04:00 PM to 05	5:00 PM	04:00 PM t	o 05:00 PM
			20	59	34	5						420		319	
AM PERIOD (0	00:00-12:00	)) — • • • •						PM PERIOL	(12:00-24	.:00)					
I WO DIREC		EAK		44.00.004				IWODIRI						00 514	
AM DE				11:00 AM to	12:00 PM	0	000	PM - F				400	D PIM to US	510 PM	045
			4.	51	45	2	7 00	PIVI - I DM L				420		519	945
	%)	<sup>(0)</sup>	15	2 81	51	10	100.00	PM - 1	ראטוטה געשני	( /0)		45.08		54 92	100.00
			5:00)		51									Total	100.00
		DD (09:00-1	5:00)					6-HR, 12-H	Ч, 24-НК F	PERIODS			IR 2	Iotal	
		EAK		11.00 111	10.00 51			AM 6-HR	PERIOD ((	J6:00-12:00)	<b>`</b>	1,763 2,	034	3,797	
PEAK H		-		II:UU AM to	12:00 PM	0	000	AM 12-HF		00:00-12:00	)	1,926 2,	100	4,100	
PEAK H		E	43	51	45	2	883	PM 6-HR		12:00-18:00)		2,281 2,	699	4,980	
DIRECTION								PM 12-HF		(12:00-24:00	)	3,202 3,	/38	6,940	
PEAK H	IR TIME		11	1:00 AM to 12:00	PM 10	:45 AM to 1	1:45 AM	24 HOUR	PERIOD			5,128 5,	918	11,046	
PEAK H	IR VOLUM	E	43	31	46	8		D (%)				46.42 53	3.58	100.00	

#### Hawaii Department of Transportation Highways Division Highways Planning Survey Section

#### **Vehicle Classification Data Summary**

2013

Site ID:	B71277000332	Route No:	2770	Date From:	2013/07/18 0:00
Town:	Hawaii	Direction:	+MP	Date To:	2013/07/19 23:45
Location:	Manono Street - Piilani Street to K	uawa St			

#### Functional Classification: 17 URBAN:COLLECTOR REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES	
Cycles	122	0.57%	244	
PC	15394	71.78%	30788	
2A-4T	5746	26.79%	11492	
LIGHT VEHICLE TOTALS	21262	99.14%	42525	

HEAVY VEHICLES									
Bus	74	0.35%	185						
SINGLE UNIT TRUCK									
2A-6T	57	0.27%	114						
3A-SU	16	0.07%	48						
4A-SU	3	0.01%	12						
SINGLE-TRAILER TRUCKS									
4A-ST	21	0.10%	84						
5A-ST	10	0.05%	50						
6A-ST	0	0.00%	0						
MULTI-TRAILER TRUCKS									
5A-MT	0	0.00%	0						
6A-MT	0	0.00%	0						
7A-MT	2	0.01%	14						
HEAVY VEHICLE TOTALS	183	0.85%	507						
CLASSIFIED VEHICLES TOTALS	21445 (A)	100.00%	43032 (B)						

1

UNCLASSIFIED VEHICLES TOTALS AXLE

CORRECTION

**FACTOR (A/C)** = 0.997

# 0.00%

#### ROADTUBE EQUIVALENT(B/2) = 21516 (C)

PEAK HOUR VOLUME : 945 2013/07/19 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7) COMBINATION	1	(65A-1) 0.11% (65B-1)	75	10300	(65A-2) 0.73% (65B-2)	9.17%
(TYPE 8-13)	2	0.21%	16		0.16%	9.17%



Run Date	e: 2015/	/04/10				Ha	waii Depa	artment of	f Trans	portation					
				н	ighwa	ys Divis	sion .		-	Highway	s Planı	ning Surve	y Secti	on	
					•		2014	Program	Count	- Summ	arv	•			
Site ID: B Functiona Location:	7127700 <b>al Class:</b> Manon	)0332 : URBAN:( 10 Street -	COLLEC Piilani S	TOR treet to Kuaw	a St		Town: H Count Ty	Hawaii <b>ype:</b> CLASS	6	DIR 1:+ Counter	MP <b>[</b> <b>Type:</b> T	<b>DIR 2:</b> -MP Tube	Final A Route	ADT: 9 No: 27	9900 70
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIMF-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 03/	/10/2014	22		/	2	22			2	5			2	22	
12:00-12:15	5	3	8	06:00-06:15	14	17	31	12.00-12.12	90	114	204	06:00-06:15	53	67	120
12:15-12:30	4	4	8	06:15-06:30	28	38	66	12:15-12:30	98	97	195	06:15-06:30	52	87	139
12:30-12:45	2	4	6	06:30-06:45	47	59	106	12:30-12:45	72	92	164	06:30-06:45	38	59	97
12:45-01:00	1	4	5	06:45-07:00	43	52	95	12:45-01:00	95	96	191	06:45-07:00	56	38	94
01:00-01:15	1	6	7	07:00-07:15	46	51	97	01:00-01:15	84	87	171	07:00-07:15	39	59	98
01:15-01:30	2	5	7	07:15-07:30	65	74	139	01:15-01:30	83	90	173	07:15-07:30	40	37	77
01:30-01:45	5	6	11	07:30-07:45	66	91	157	01:30-01:45	87	75	162	07:30-07:45	33	32	65
01:45-02:00	4	3	7	07:45-08:00	80	107	187	01:45-02:00	78	85	163	07:45-08:00	33	29	62
02:00-02:15	1	3	4	08:00-08:15	78	73	151	02:00-02:15	79	112	191	08:00-08:15	25	29	54
02:15-02:30	1	2	3	08:15-08:30	58	92	150	02:15-02:30	84	111	195	08:15-08:30	23	33	56
02:30-02:45	3	1	4	08:30-08:45	70	79	149	02:30-02:45	89	109	198	08:30-08:45	14	16	30
02:45-03:00	2	1	3	08:45-09:00	77	100	177	02:45-03:00	82	123	205	08:45-09:00	32	16	48
03:00-03:15	2	4	6	09:00-09:15	72	79	151	03:00-03:15	98	105	203	09:00-09:15	23	24	47
03:15-03:30	1	6	7	09:15-09:30	67	81	148	03:15-03:30	95	84	179	09:15-09:30	14	19	33
03:30-03:45	6	4	10	09:30-09:45	72	83	155	03:30-03:45	98	96	194	09:30-09:45	12	18	30
03:45-04:00	6	7	13	09:45-10:00	81	75	156	03:45-04:00	98	115	213	09:45-10:00	16	19	35
04:00-04:15	6	5	11	10:00-10:15	69	105	174	04:00-04:15	129	131	260	10:00-10:15	15	20	35
04:15-04:30	5	5	10	10:15-10:30	85	97	182	04:15-04:30	91	102	193	10:15-10:30	12	13	25
04:30-04:45	11	4	15	10:30-10:45	83	82	165	04:30-04:45	89	126	215	10:30-10:45	10	19	29
04:45-05:00	15	4	19	10:45-11:00	100	88	188	04:45-05:00	115	133	248	10:45-11:00	11	8	19
05:00-05:15	11	16	27	11.00-11.15	79	88	167	05:00-05:15	95	83	178	11:00-11:15	5	13	18
05:15-05:30	18	12	30	11:15-11:30	86	112	198	05:15-05:30	107	91	198	11:15-11:30	7	9	16
05:30-05:45	17	12	29	11:30-11:45	83	117	200	05:30-05:45	74	89	163	11:30-11:45	, 8	12	20
05:45-06:00	27	14	41	11:45-12:00	89	125	214	05:45-06:00	56	98	154	11:45-12:00	3	8	11
		D /05 00 00 0													
AM COMMUT TWO DIREC AM - PE AM - PE	ER PERIOI CTIONAL PI EAK HR TIN EAK HR VC	D (05:00-09:0 EAK ME DLUME	10) L 2	07:30 AM to 82	08:30 AM 36	3	645	PM COMMU TWO DIR PM - PM -	JTER PER ECTIONAL PEAK HR PEAK HR	IOD (15:00-1 _ PEAK TIME VOLUME	9:00)	DIR 1 04:00 424	0 PM to 05	DIR 2 :00 PM 492	916
AM - K AM - D	FACTOR (% (%)	%)	4	3.72	56	.28	6.61 100.00	PM - PM -	K FACTOF D (%)	R (%)		46.29		53.71	9.38 100.00
AM - PE AM - PE	AL PEAK AK HR TIM AK HR VOI	IE LUME	0 2	7:15 AM to 08:15 89	AM 07 36	:30 AM to 0 3	8:30 AM	PM - I PM - I	PEAK HR	r Time Volume		04:00 PM to 05 424	5:00 PM	04:00 PM to 492	o 05:00 PM
AM PERIOD (	00:00-12:00	D)						PM PERIOD	0 (12:00-24	l:00)					
TWO DIREC	TIONAL P	EAK						TWO DIR	ECTIONAL	PEAK					
AM - PE	EAK HR TIN	ЛE		11:00 AM to	12:00 PM			PM - 1	PEAK HR	TIME		04:00	0 PM to 05	:00 PM	
AM - PE	EAK HR VC	DLUME	3	37	44	2	779	PM - 1	PEAK HR	VOLUME		424		492	916
AM - K	FACTOR (%	%)					7.98	PM - I	K FACTOR	₹ (%)					9.38
AM - D	(%)		4	3.26	56	.74	100.00	PM - I	D (%)			46.29		53.71	100.00
NON-COMMU	TER PERI	OD (09:00-15	:00)					6-HR, 12-H	R, 24-HR F	PERIODS		DIR 1 DI	R 2	Total	
TWO DIREC	TIONAL P	EAK						AM 6-HR	PERIOD (	06:00-12:00)		1,638 1.5	965	3,603	
PEAK H	IR TIME			11:15 AM to	12:15 PM			AM 12-HF		(00:00-12:00)		1,794 2.	100	3,894	
PEAK H	R VOLUM	E	3	48	46	8	816	PM 6-HR	PERIOD (	12:00-18:00)		2,166 2.	444	4,610	
DIRECTION	IAL PFAK		-					PM 12-HF		(12:00-24:00)		2.740 3	128	5.868	
PEAK			1	1:30 AM to 12:30	PM 11	15 AM to 1	2:15 PM	24 HOUR	PERIOD	( <b>_</b>		4.534 5	228	9.762	
		E	د	60		8		D /0/ )				16.45 53	2 55	100.00	
			3	00	40	0		D ( /0)				-0.40 00		100.00	

Run Date	e: 2015	/04/10				Ha	waii Depa	artment of	Trans	portation					
				н	ighway	/s Divis	sion		-	Highway	s Planı	ning Surve	y Secti	on	
							2014	Program	Count	- Summa	arv	-	-		
Site ID: B	7127700 al Class	0332 : URBAN:(	COLLEC	TOR			Town: ⊦ Count Ty	lawaii <b>/pe:</b> CLASS	6	DIR 1:+ Counter	MP [ Type: T	<b>DIR 2:</b> -MP Tube	Final <i>I</i> Route	ADT: 9 No: 27	9900 70
Location:	Manor	no Street -	Piilani Si	treet to Kuaw	a St		-	•							
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE: 03/	11/2014														
12:00-12:15	8	3	11	06:00-06:15	19	20	39	12:00-12:15	97	98	195	06:00-06:15	72	84	156
12:15-12:30	9	5	14	06:15-06:30	46	54	100	12:15-12:30	84	117	201	06:15-06:30	67	95	162
12:30-12:45	8	7	15	06:30-06:45	50	50	100	12:30-12:45	104	104	208	06:30-06:45	53	93	146
12:45-01:00	4	7	11	06:45-07:00	50	52	102	12:45-01:00	96	108	204	06:45-07:00	48	80	128
01:00-01:15	1	6	7	07:00-07:15	58	61	119	01:00-01:15	96	104	200	07:00-07:15	55	65	120
01:15-01:30	1	4	5	07:15-07:30	66	89	155	01:15-01:30	81	129	210	07:15-07:30	37	69	106
01:30-01:45	3	12	15	07:30-07:45	84	86	170	01:30-01:45	97	129	226	07:30-07:45	26	42	68
01:45-02:00	4	3	7	07:45-08:00	81	117	198	01:45-02:00	76	115	191	07:45-08:00	18	24	42
02:00-02:15	1	6	7	08:00-08:15	72	104	176	02:00-02:15	107	119	226	08:00-08:15	36	36	72
02:15-02:30	1	4	5	08:15-08:30	87	91	178	02:15-02:30	102	117	219	08:15-08:30	28	22	50
02:30-02:45	5	3	8	08:30-08:45	86	91	177	02:30-02:45	95	120	215	08:30-08:45	37	38	75
02:45-03:00	5	3	8	08:45-09:00	74	100	174	02:45-03:00	95	131	226	08:45-09:00	36	16	52
03:00-03:15	1	2	3	09:00-09:15	75	83	158	03:00-03:15	105	130	235	09:00-09:15	29	30	59
03:15-03:30	1	3	4	09:15-09:30	90	98	188	03:15-03:30	103	118	221	09:15-09:30	24	29	53
03:30-03:45	7	3	10	09:30-09:45	82	106	188	03:30-03:45	102	126	228	09:30-09:45	28	28	56
03:45-04:00	8	6	14	09:45-10:00	69	74	143	03:45-04:00	97	138	235	09:45-10:00	18	19	37
04:00-04:15	6	7	13	10:00-10:15	76	93	169	04:00-04:15	143	134	277	10:00-10:15	10	23	33
04:15-04:30	4	5	9	10:15-10:30	74	101	175	04:15-04:30	125	124	249	10:15-10:30	15	13	28
04:30-04:45	10	5	15	10:30-10:45	72	89	161	04:30-04:45	103	151	254	10:30-10:45	19	14	33
04:45-05:00	13	7	20	10:45-11:00	88	100	188	04:45-05:00	106	118	224	10:45-11:00	7	8	15
05:00-05:15	10	2	12	11:00-11:15	89	92	181	05:00-05:15	118	119	237	11:00-11:15	8	12	20
05:15-05:30	14	10	24	11:15-11:30	91	111	202	05:15-05:30	104	146	250	11:15-11:30	9	9	18
05:30-05:45	17	11	28	11:30-11:45	85	111	196	05:30-05:45	86	94	180	11:30-11:45	7	16	23
05:45-06:00	24	26	50	11:45-12:00	107	89	196	05:45-06:00	74	81	155	11:45-12:00	6	5	11
AM COMMUTE TWO DIREC	ER PERIO TIONAL P	D (05:00-09:0 EAK	0) D	IR 1	DI	32		PM COMML	JTER PER ECTIONAL	NOD (15:00-19 _ PEAK	9:00)	DIR 1		DIR 2	
AM - PE	AK HR TIN	ИE		07:45 AM to	08:45 AM			PM - I	PEAK HR	TIME		03:45	5 PM to 04	:45 PM	
AM - PE AM - K F	EAK HR VC	DLUME %)	32	26	40	3	729 6.64	PM -   PM -	PEAK HR K FACTOF	VOLUME ? (%)		468		547	1015 9.25
AM - D ( DIRECTION	(%) AL PEAK		44	4.72	55	28	100.00	PM - I DIRECTIC	D (%) NAL PEA	ĸ		46.11		53.89	100.00
AM - PE AM - PE	AK HR TIN AK HR VO	1E LUME	01	7:45 AM to 08:45 26	AM 07 40	45 AM to 0 3	8:45 AM	PM - F PM - F	PEAK HR PEAK HR	TIME VOLUME		04:00 PM to 05 477	5:00 PM	03:45 PM t 547	o 04:45 PM
AM PERIOD (	00:00-12:00	0)						PM PERIOD	) (12:00-24	l:00)					
TWO DIREC	TIONAL P	EAK						TWO DIRI	ECTIONAL	PEAK					
AM - PE	AK HR TI	ИE		11:00 AM to	12:00 PM			PM - F	PEAK HR	TIME		03:45	5 PM to 04	:45 PM	
AM - PE	AK HR VC	DLUME	3	72	40	3	775	PM - F	PEAK HR	VOLUME		468		547	1015
AM - K F	FACTOR (9	%)					7.06	PM - F	< FACTOR	R (%)					9.25
AM - D (	(%)		48	8.00	52	00	100.00	PM - I	ר (%)			46.11		53.89	100.00
NON-COMMU	TER PERI	OD (09:00-15	:00)					6-HR, 12-HI	r, 24-hr f	PERIODS		DIR 1 DI	R 2	Total	
TWO DIREC	TIONAL P	EAK						AM 6-HR	PERIOD (	06:00-12:00)		1,771 2,0	062	3,833	
PEAK H	IR TIME			02:00 PM to	03:00 PM			AM 12-HF	R PERIOD	(00:00-12:00)		1,936 2,2	212	4,148	
PEAK H	IR VOLUM	E	39	99	48	7	886	PM 6-HR	PERIOD (	12:00-18:00)		2,396 2,8	870	5,266	
DIRECTION	AL PEAK							PM 12-HF		(12:00-24:00)		3,089 3.1	740	6,829	
PEAK H	HR TIME		02	2:00 PM to 03:00	PM 01	15 PM to 0	2:15 PM	24 HOUR	PERIOD	,		5,025 5,9	952	10,977	
PEAK H	HR VOLUN	IE	39	99	49	2		D (%)				45.78 54	.22	100.00	
			-		-			( /						-	

#### Hawaii Department of Transportation Highways Division Highways Planning Survey Section

#### **Vehicle Classification Data Summary**

2014

Site ID:	B71277000332	Route No:	2770	Date From:	2014/03/10 0:00
Town:	Hawaii	Direction:	+MP	Date To:	2014/03/11 23:45
Location:	Manono Street - Piilani Street to K	uawa St			

#### Functional Classification: 17 URBAN:COLLECTOR REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES	
Cycles	158	0.76%	315	
PC	14991	72.28%	29982	
2A-4T	5340	25.75%	10680	
LIGHT VEHICLE TOTALS	20489	98.79%	40977	

	HEAVY VEHIC	<u>CLES</u>		
Bus	113	0.54%	283	
SINGLE UNIT TRUCK				
2A-6T	59	0.28%	118	
3A-SU	34	0.16%	102	
4A-SU	3	0.01%	12	
SINGLE-TRAILER TRUCKS				
4A-ST	24	0.12%	96	
5A-ST	13	0.06%	65	
6A-ST	3	0.01%	18	
MULTI-TRAILER TRUCKS				
5A-MT	1	0.00%	5	
6A-MT	0	0.00%	0	
7A-MT	0	0.00%	0	
HEAVY VEHICLE TOTALS	250	1.21%	699	
CLASSIFIED VEHICLES TOTALS	20739 (A)	100.00%	41676 (B)	
UNCLASSIFIED VEHICLES TOTALS	0	0.00%		

UNCLASSIFIED VEHICLES TOTALS AXLE CORRECTION

# 

FACTOR (A/C) = 0.995

EQUIVALENT(B/2) = 20	0838 (C)
----------------------	----------

PEAK HOUR VOLUME : 1004 2014/03/11 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7) COMBINATION	8	(65A-1) 0.80% (65B-1)	104	9900	(65A-2) 1.05% (65B-2)	10.14%
(TYPE 8-13)	0	0.00%	20		0.20%	10.14%



Run Date	e: 2016	/05/19				Ha	waii Depa	artment of	f Trans	portation					
				Н	lighway	ys Divis	sion .			Highway	s Planı	ning Surve	y Secti	on	
					-	-	2015	Program	Count	- Summa	ary	-	-		
Site ID: B	7127700	0332		TOR			Town: H	Hawaii	2	DIR 1:+		DIR 2:-MP	Final /	AADT: 8	8200 70
Location:	Manor	no Street -	Piilani S	treet to Kuaw	/a St		oount i	ype.ol/(oc		oounter	Type.	400	noute	110. 27	
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 08/	06/2015														
12:00-12:15	7	6	13	06:00-06:15	29	17	46	12:00-12:15	90	71	161	06:00-06:15	45	70	115
12:15-12:30	10	5	15	06:15-06:30	43	50	93	12:15-12:30	90	72	162	06:15-06:30	64	70	134
12:30-12:45	15	10	25	06:30-06:45	41	49	90	12:30-12:45	64	86	150	06:30-06:45	61	67	128
12:45-01:00	6	5	11	06:45-07:00	58	56	114	12:45-01:00	70	79	149	06:45-07:00	55	61	116
01:00-01:15	7	10	17	07:00-07:15	51	42	93	01:00-01:15	60	68	128	07:00-07:15	40	51	91
01:15-01:30	6	7	13	07:15-07:30	65	61	126	01:15-01:30	73	73	146	07:15-07:30	36	63	99
01:30-01:45	8	9	17	07:30-07:45	76	75	151	01:30-01:45	65	78	143	07:30-07:45	38	42	80
01:45-02:00	4	4	8	07:45-08:00	55	88	143	01:45-02:00	58	85	143	07:45-08:00	35	23	58
02:00-02:15	0	8	8	08:00-08:15	68	82	150	02:00-02:15	80	80	160	08:00-08:15	29	39	68
02:15-02:30	6	3	9	08:15-08:30	53	63	116	02:15-02:30	64	75	139	08:15-08:30	36	22	58
02:30-02:45	2	4	6	08:30-08:45	66	51	117	02:30-02:45	55	80	135	08:30-08:45	42	27	69
02:45-03:00	1	4	5	08:45-09:00	58	66	124	02:45-03:00	63	82	145	08:45-09:00	34	26	60
03:00-03:15	8	4	12	09:00-09:15	56	36	92	03:00-03:15	87	62	149	09:00-09:15	36	24	60
03:15-03:30	10	5	15	09:15-09:30	50	64	123	03:15-03:30	70	71	150	09:15-09:30	17	19	36
03.30-03.45	11	2	13	09:10-09:30	54	63	117	03:30-03:45	64	75	130	09.10-09.00	46	10	65
03.30-03.43	2	2	13	09.30-09.43	54	77	117	03:45 04:00	70	73	159	09.30-09.43	40	19	47
03.45-04.00	3	1	4	10:00 10:15	71	11	137	03.45-04.00	79	74	100	10:00 10:15	20	19	47
04:00-04:15	/	8	10	10:00-10:15	/ 1	48	119	04:00-04:15	93	65 70	1/8	10:00-10:15	24	19	43
04:15-04:30	9	8	17	10:15-10:30	47	60	112	04:15-04:30	100	79	100	10:15-10:30	21	19	40
04:30-04:45	12	8	20	10:30-10:45	73	60	133	04:30-04:45	102	86	188	10:30-10:45	17	17	34
04:45-05:00	13	6	19	10:45-11:00	80	88	168	04:45-05:00	91	86	1//	10:45-11:00	17	6	23
05:00-05:15	19	9	28	11:00-11:15	60	/1	131	05:00-05:15	75	68	143	11:00-11:15	13	14	27
05:15-05:30	20	6	26	11:15-11:30	65	70	135	05:15-05:30	61	68	129	11:15-11:30	15	12	27
05:30-05:45	24	14	38	11:30-11:45	49	81	130	05:30-05:45	48	89	137	11:30-11:45	16	11	27
05:45-06:00	34	20	54	11:45-12:00	90	67	157	05:45-06:00	60	86	146	11:45-12:00	12	/	19
AM COMMUTE	ER PERIO	D (05:00-09:0	0) D	VIR 1	DI	R 2		PM COMM	JTER PEF	RIOD (15:00-1	9:00)	DIR 1		DIR 2	
TWO DIREC	TIONAL P	EAK						TWO DIR	ECTIONA	L PEAK					
AM - PE	AK HR TIN	ЛЕ		07:15 AM to	08:15 AM			PM -	PEAK HR	TIME		04:00	0 PM to 05	5:00 PM	
AM - PE	AK HR VC	DLUME	2	64	30	6	570	PM -	PEAK HR	VOLUME		372		336	708
AM - K F	-ACTOR (%	%)					6.73	PM -	K FACTO	ר (%)					8.36
AM - D (	(%)		4	6.32	53	.68	100.00	PM -	D (%)			52.54		47.46	100.00
DIRECTION	AL PEAK							DIRECTIC	NAL PEA	К					
AM - PE			0	7:15 AM to 08:15	AM 07	:30 AM to 0	8:30 AM	PM - F				04:00 PM to 05	5:00 PM	04:00 PM t	o 05:00 PM
AM - PE	AK HR VO	LUME	2	64	30	8		PM - I	PEAK HR	VOLUME		372		336	
AM PERIOD (0	00:00-12:00	0)						PM PERIOD	0 (12:00-24	4:00)					
TWO DIREC	TIONAL P	EAK						TWO DIRI	ECTIONAL	_ PEAK					
AM - PE	AK HR TIN	ЛЕ		07:15 AM to	08:15 AM			PM -	PEAK HR	TIME		04:00	0 PM to 05	5:00 PM	
AM - PE	AK HR VC	DLUME	2	64	30	6	570	PM -	PEAK HR	VOLUME		372		336	708
AM - K F	-ACTOR (%	%)					6.73	PM - 1	K FACTOF	R (%)					8.36
AM - D (	(%)		4	6.32	53	.68	100.00	PM -	D (%)			52.54		47.46	100.00
NON-COMMU	TER PERI	OD (09:00-15:	:00)					6-HR, 12-H	R, 24-HR	PERIODS		DIR 1 DI	R 2	Total	
TWO DIREC	TIONAL P	EAK						AM 6-HR	PERIOD (	06:00-12:00)		1,427 1,4	490	2,917	
PEAK H	IR TIME			11:45 AM to	12:45 PM			AM 12-HF		(00:00-12:00)		1,669 1.0	656	3,325	
PFAK H	IR VOLUM	E	3	34	29	6	630	PM 6-HR	PERIOD (	12:00-18:00)		1.757 1	858	3.615	
			0	-	_0	-		PM 12-HF		(12.00-24.00)		2 534 2	605	5 139	
			1	1.45 AM to 12.45	PM 01	·45 PM to 0	2.45 PM	24 HOUD		(12.00-24.00)		4 203 4	261	8 464	
			1	1.70 AIVI LU 12.40	- IVI UI							40.66 50	24	100.00	
PEAK F	IN VULUIV	IC	3	34	32	U		D (%)				49.00 50	1.34	100.00	

Run Date	e: 2016	/05/19				Ha	waii Depa	artment of	Trans	portation	1				
				Н	lighwa	ys Divis	sion .			Highway	s Plan	ning Surve	y Secti	on	
					-	-	2015	Program	Count	- Summ	ary	-			
Site ID: B	7127700	0332					Town: H	lawaii		DIR 1:+	MP I	DIR 2:-MP	Final A	AADT:	8200
Functiona	al Class:	URBAN:C	OLLEC	CTOR			Count T	vpe:CLASS	3	Counter	r Type: ]	Гube	Route	No: 27	70
Location:	Manon	no Street -	Piilani S	Street to Kuaw	/a St						71				
		ס חוח	TOTAL			ם חוח	TOTAL			0 חוח	τοται				TOTAL
	DIR 1	DIR 2	TOTAL	TIVE-AW	DIR I	DIR 2	TOTAL	TIME-PM	DIR I	DIR 2	TOTAL	TIVIE-PIVI	DIR I	DIR 2	TOTAL
12:00 12:15	07/2015	7	10	06:00 06:15	24	20	44	10:00 10:15	76	90	165	06:00 06:15	96	6E	151
12:00-12:13	2	11	14	06:15 06:20	24 47	20 51	44	12:00-12:13	70	80	167	06:15 06:20	00 Q1	66	147
12:30-12:45	10	1	14	06:30-06:45	30	30	78	12:30-12:45	76	96	172	06:30-06:45	66	7/	140
12:30-12:43	0	4	14	06:45 07:00	59	42	100	12:30-12:43	70	90	172	06:45 07:00	62	55	140
12.45-01.00	0	11	19	00.45-07.00	50	42	100	12.45-01.00	90	100	100	00.45-07.00	40	55	100
01:00-01:15	4	4	0 7	07:00-07:15	30	43	99	01:00-01:15	63	100	163	07:00-07:15	48	58	106
01:15-01:30	3	4	/	07:15-07:30	70	56	126	01:15-01:30	83	76	159	07:15-07:30	47	42	89
01:30-01:45	2	8	10	07:30-07:45	68	54	122	01:30-01:45	83	/9 05	162	07:30-07:45	45	40	85
01:45-02:00	3	4	/	07:45-08:00	69	/0	139	01:45-02:00	90	65	155	07:45-08:00	37	59	96
02:00-02:15	3	/	10	08:00-08:15	55	80	135	02:00-02:15	/9	83	162	08:00-08:15	47	38	85
02:15-02:30	0	4	4	08:15-08:30	71	66	137	02:15-02:30	78	77	155	08:15-08:30	42	27	69
02:30-02:45	1	3	4	08:30-08:45	66	52	118	02:30-02:45	82	92	174	08:30-08:45	30	37	67
02:45-03:00	1	2	3	08:45-09:00	68	70	138	02:45-03:00	90	90	180	08:45-09:00	34	34	68
03:00-03:15	4	5	9	09:00-09:15	74	56	130	03:00-03:15	90	87	177	09:00-09:15	23	56	79
03:15-03:30	8	7	15	09:15-09:30	74	74	148	03:15-03:30	106	70	176	09:15-09:30	46	24	70
03:30-03:45	10	2	12	09:30-09:45	49	62	111	03:30-03:45	83	80	163	09:30-09:45	34	40	74
03:45-04:00	17	7	24	09:45-10:00	74	67	141	03:45-04:00	96	107	203	09:45-10:00	36	32	68
04:00-04:15	8	7	15	10:00-10:15	62	74	136	04:00-04:15	106	82	188	10:00-10:15	32	24	56
04:15-04:30	9	3	12	10:15-10:30	94	77	171	04:15-04:30	120	81	201	10:15-10:30	21	37	58
04:30-04:45	7	8	15	10:30-10:45	86	86	172	04:30-04:45	86	82	168	10:30-10:45	19	23	42
04:45-05:00	10	10	20	10:45-11:00	71	75	146	04:45-05:00	90	78	168	10:45-11:00	23	32	55
05:00-05:15	11	6	17	11:00-11:15	84	63	147	05:00-05:15	71	70	141	11:00-11:15	24	20	44
05:15-05:30	6	11	17	11:15-11:30	93	73	166	05:15-05:30	56	71	127	11:15-11:30	14	17	31
05:30-05:45	14	10	24	11:30-11:45	81	80	161	05:30-05:45	79	71	150	11:30-11:45	18	30	48
05:45-06:00	23	24	47	11:45-12:00	99	67	166	05:45-06:00	80	67	147	11:45-12:00	17	14	31
АМ СОММИТІ	ER PERIOI	D (05:00-09:0	0) (0	DIR 1	DI	R 2		PM COMM	JTER PEF	RIOD (15:00-1	9:00)	DIR 1		DIR 2	
TWO DIREC	TIONAL PI	EAK	- /					TWO DIR	ECTIONA	PEAK	/				
AM - PE	AK HR TIN	ΛE		07:30 AM to	08:30 AM	1		PM -	PEAK HR	TIME		03:45	5 PM to 04	1:45 PM	
AM - PE	AK HR VO		2	263	27	0	533	PM -	PEAK HR	VOLUME		408		352	760
AM - K F	ACTOR (%	6)					5.70	PM -	K FACTO	R (%)					8.13
AM - D (			4	49.34	50	.66	100.00	PM -	D (%)	. ,		53.68		46.32	100.00
DIRECTION	AL PEAK							DIRECTIO	NAL PEA	К					
AM - PE	AK HR TIM	1E	(	07:00 AM to 08:00	AM 07	:30 AM to 0	8:30 AM	PM - I	PEAK HR	TIME		03:45 PM to 04	1:45 PM	03:45 PM t	o 04:45 PM
AM - PE	AK HR VO	LUME	2	263	27	0		PM - I	PEAK HR	VOLUME		408		352	
AM PERIOD (	00:00-12:00	D)						PM PERIO	) (12:00-24	1:00)					
TWO DIREC	TIONAL PI	EAK						TWO DIR	ECTIONAL	PEAK					
AM - PF	AK HR TIN	л		11.00 AM to	12.00 PM	1		PM -	PEAK HR	TIME		03.4	5 PM to 04	1·45 PM	
AM - PE	AK HR VO		3	357	28	3	640	PM -	PEAK HR	VOLUME		408		352	760
AM - K F	ACTOR (9	6)			_0	-	6.85	PM -	K FACTOR	R (%)					8.13
AM - D (	(%)	,	Ę	55.78	44	.22	100.00	PM -	D (%)	···/		53.68		46.32	100.00
		OD (09:00-15:	:00)					6-HR, 12-H	R, 24-HR	PERIODS		DIR 1 DI	R 2	Total	
TWO DIREC		FAK	- /					AM 6-HR	PERIOD (	06.00-15.00		1632 14	497	3 129	
				12.00 PM+	01.00 PM	1				(00.00 12.00)	)	1 803 1	366	3 460	
		<b>_</b>		12.001 WILL	vi 100.10 , مرد	o	691			12.00 10.00	,	2044 1	250	4 000	
		L	·	555	34	υ	001			12.00-10.00)	<b>`</b>	2,044 1,5	000	4,000	
					DM 10			PM 12-HF		(12:00-24:00)	)	2,9/6 2,9	900	5,876	
PEAKE		-	-	11:00 AIVI to 12:00	PIVI 12	. 15 PINI to 0	1.15 PM	24 HOUR	PERIOD			4,779 4,	000	9,345	
PEAK F	IR VOLUM	IE	3	357	35	9		D (%)				51.14 48	.86	100.00	

#### Hawaii Department of Transportation Highways Division Highways Planning Survey Section

#### **Vehicle Classification Data Summary**

2015

Site ID:	B71277000332	Route No:	2770	Date From:	2015/08/06 0:00
Town:	Hawaii	Direction:	+MP	Date To:	2015/08/07 23:45
Location:	Manono Street - Piilani Street to K	luawa St			

#### Functional Classification: 17 URBAN:COLLECTOR REPORT TOTALS - 48 HOURS RECORDED

	VOLUME	%	NUMBER OF AXLES	
Cycles	37	0.21%	75	
PC	12913	72.51%	25826	
2A-4T	4574	25.68%	9148	
LIGHT VEHICLE TOTALS	17524	98.40%	35049	

	HEAVY VEHIC	<u>CLES</u>		
Bus	86	0.48%	215	
SINGLE UNIT TRUCK				
2A-6T	79	0.44%	158	
3A-SU	48	0.27%	144	
4A-SU	13	0.07%	52	
SINGLE-TRAILER TRUCKS				
4A-ST	22	0.12%	88	
5A-ST	8	0.04%	40	
6A-ST	2	0.01%	12	
MULTI-TRAILER TRUCKS				
5A-MT	2	0.01%	10	
6A-MT	17	0.10%	102	
7A-MT	8	0.04%	56	
HEAVY VEHICLE TOTALS	285	1.60%	877	
CLASSIFIED VEHICLES TOTALS	17809 (A)	100.00%	35926 (B)	

-0

UNCLASSIFIED VEHICLES TOTALS

CORRECTION FACTOR (A/C) = 0.991

#### ROADTUBE EQUIVALENT(B/2) = 17963 (C)

-0.00%

PEAK HOUR VOLUME : 725 2015/08/07 16:00	PEAK HOUR TRUCK VOLUME	% TOTAL PEAK HOUR VOLUME	24 HOUR TRUCK VOLUME	AADT	% OF AADT	HPMS K-FACTOR (PEAK/AADT) (ITEM 66)
SINGLE UNIT TRUCKS (TYPE 4-7)	9	(65A-1) 1.24%	113	8200	(65A-2) 1.38%	8.84%
COMBINATION (TYPE 8-13)	5	(65B-1) 0.69%	29		(65B-2) 0.35%	8.84%



Run Date: 2017/07/24 Hawaii Department o Highways Division 2016 Program							of Transportation Highways Planning Survey Section								
					.g	<i>j</i>	2016	Program	Count	- Summ	arv		,	•	
Site ID: B Functiona Location:	7127700 <b>al Class:</b> Manon	0332 : URBAN:0 io Street -	COLLEC Piilani S	TOR treet to Kuaw	a St		Town: H	Hawaii <b>ype:</b> VOLUN	ME	DIR 1: + Counter	MP <b>E</b> r <b>Type:</b> T	DIR 2:-MP Tube	Final A Route	ADT: No: 27	7600 70
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/	13/2016														
12:00-12:15	7	5	12	06:00-06:15	25	22	47	12:00-12:15	64	67	131	06:00-06:15	66	42	108
12:15-12:30	13	4	17	06:15-06:30	41	21	62	12:15-12:30	64	69	133	06:15-06:30	58	41	99
12:30-12:45	7	4	11	06:30-06:45	56	24	80	12:30-12:45	58	65	123	06:30-06:45	35	51	86
12:45-01:00	2	4	6	06:45-07:00	51	34	85	12:45-01:00	64	59	123	06:45-07:00	59	53	112
01:00-01:15	3	3	6	07:00-07:15	48	32	80	01:00-01:15	56	62	118	07:00-07:15	39	24	63
01:15-01:30	5	3	8	07:15-07:30	52	46	98	01:15-01:30	52	73	125	07:15-07:30	52	33	85
01:30-01:45	4	4	8	07:30-07:45	67	48	115	01:30-01:45	61	82	143	07:30-07:45	34	21	55
01:45-02:00	3	3	6	07:45-08:00	48	69	117	01:45-02:00	58	90	148	07:45-08:00	28	14	42
02:00-02:15	3	1	4	08:00-08:15	62	45	107	02:00-02:15	84	76	160	08:00-08:15	25	12	37
02:15-02:30	2	0	2	08:15-08:30	69	54	123	02:15-02:30	71	81	152	08:15-08:30	32	13	45
02:30-02:45	3	0	3	08:30-08:45	57	40	97	02:30-02:45	74	77	151	08:30-08:45	26	7	33
02:45-03:00	3	0	3	08:45-09:00	60	48	108	02:45-03:00	59	60	119	08:45-09:00	24	9	33
03:00-03:15	1	1	2	09:00-09:15	58	40	98	03:00-03:15	88	83	171	09:00-09:15	20	13	33
03:15-03:30	1	2	3	09:15-09:30	59	46	105	03:15-03:30	75	//	152	09:15-09:30	15	10	25
03:30-03:45	4	0	4	09:30-09:45	46	67	113	03:30-03:45	78	63	141	09:30-09:45	15	11	26
03:45-04:00	5	2	7	09:45-10:00	50	62	112	03:45-04:00	79	61	140	09:45-10:00	13	6	19
04:00-04:15	2	1	3	10:00-10:15	58	62	120	04:00-04:15	86	59	145	10:00-10:15	8	9	17
04:15-04:30	9	3	12	10:15-10:30	52	75	127	04:15-04:30	98	83	181	10:15-10:30	13	13	26
04:30-04:45	7	2	9	10:30-10:45	76	73	149	04:30-04:45	85	90	175	10:30-10:45	8	3	11
04:45-05:00	14	3	17	10:45-11:00	64	86	150	04:45-05:00	93	78	171	10:45-11:00	14	9	23
05:00-05:15	7	3	10	11:00-11:15	62	67	129	05:00-05:15	77	56	133	11:00-11:15	10	3	13
05:15-05:30	10	4	14	11:15-11:30	67	97	164	05:15-05:30	69	61	130	11:15-11:30	6	3	9
05:30-05:45	14	10	24	11:30-11:45	64	71	135	05:30-05:45	68	45	113	11:30-11:45	8	1	9
05:45-06:00	23	14	37	11:45-12:00	/3	67	140	05:45-06:00	46	43	89	11:45-12:00	5	5	10
AM COMMUTI		D (05:00-09:0	0) D	DIR 1	DI	R 2		PM COMM	JTER PEF	RIOD (15:00-1	9:00)	DIR 1		DIR 2	
TWO DIREC		EAK						TWO DIR	ECTIONA			04.0			
AM - PE			0	07:30 AM to	08:30 AN	1	400	PM -				04:00	J PIVI to US	010 PM	070
			2	40	21	0	402	PIVI -				302		310	0.24
AM - D (	(%)	0)	5	3.25	46	.75	100.00	PM -	D (%)	v (70)		53.87		46.13	100.00
		IF	0	8.00 AM to 00.00	ΔΜ 07	·30 AM to 0	8·30 AM						5:00 PM	04.00 PM+	0.05:00 PM
AM - PE	ak hr tivi Ak hr voi		2	48	21	.30 AM 10 0	0.30 AW	PM - F	PEAK HR	VOLUME		362	5.00 F IVI	310	0 03.00 F M
	00:00-12.00	))							) (12:00-24	4:00)					
TWO DIREC	TIONAL PI	, EAK						TWO DIRI	ECTIONAI	PEAK					
AM - PE	AK HR TIN	/E		10:30 AM to	11:30 AM	1		PM -	PEAK HR	TIME		04:00	0 PM to 05	:00 PM	
AM - PE	AK HR VO	LUME	2	69	32	3	592	PM -	PEAK HR	VOLUME		362		310	672
AM - K F	ACTOR (%	6)					8.14	PM -	K FACTOF	R (%)					9.24
AM - D (	(%)		4	5.44	54	.56	100.00	PM -	D (%)			53.87		46.13	100.00
NON-COMMU	TER PERIO	OD (09:00-15	:00)					6-HR. 12-H	R, 24-HR	PERIODS		DIR 1 DI	R 2	Total	
TWO DIREC		EAK	- /					AM 6-HR	PERIOD (	06:00-12:00)		1.365 1	296	2.661	
PFAK H				01:45 PM to	02:45 PM	1		AM 12-HF		(00:00-12:00)	)	1.517 1	372	2.889	
		F	0	87	20.001	4	611	PM 6-HP		12.00-18.00	/	1 707 1	 660	3,367	
		-	2		52	•	511			(12.00 24.00)	<b>`</b>	2 320 2	066	4 386	
			0	2.00 PM to 03.00	PM 01	-30 PM to 0	2:30 PM			(12.00-24.00	)	3,320 2,	438	7 275	
		E	0	2.00 F IVI LU US:UU			2.30 F IVI		LUOD			5,057 3,4	100	100.00	
PEAK F	TR VOLUM		2	00	32	Э		D (%)				52.74 47	.20	100.00	

Run Date	e: 2017/	/07/24				На	waii Depa	artment of	Trans	portation	1				
				F	lighwa	ys Divis	sion			Highway	vs Plani	ning Survey	y Sect	ion	
							2016	Program	Count	- Summa	ary				
Site ID: B	7127700	0332					Town:	Hawaii	4	DIR 1:+	MP <b>E</b>	DIR 2:-MP	Final .	AADT:	7600
Location	Manon	CRDAN.C	Diilani S	TOR Street to Kuaw	va St		Count	ype: VOLUI	VIC	Counter	iype:	ube	Roule	e NO: 27	70
LUCATION.	Manon	io Stieet -													
TIME-AM	DIR 1	DIR 2	TOTAL	TIME-AM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL	TIME-PM	DIR 1	DIR 2	TOTAL
DATE : 04/	14/2016														
12:00-12:15	3	0	3	06:00-06:15	28	11	39	12:00-12:15	85	92	177	06:00-06:15	67	73	140
12:15-12:30	2	2	4	06:15-06:30	49	24	73	12:15-12:30	72	93	165	06:15-06:30	65	77	142
12:30-12:45	7	3	10	06:30-06:45	52	28	80	12:30-12:45	92	78	170	06:30-06:45	54	65	119
12:45-01:00	2	1	3	06:45-07:00	47	28	75	12:45-01:00	68	103	171	06:45-07:00	43	75	118
01:00-01:15	7	1	8	07:00-07:15	58	22	80	01:00-01:15	79	83	162	07:00-07:15	33	75	108
01:15-01:30	3	1	4	07:15-07:30	49	40	89	01:15-01:30	80	89	169	07:15-07:30	36	56	92
01:30-01:45	4	6	10	07:30-07:45	69	53	122	01:30-01:45	84	75	159	07:30-07:45	27	37	64
01:45-02:00	2	2	4	07:45-08:00	57	69	126	01:45-02:00	70	86	156	07:45-08:00	37	28	65
02:00-02:15	3	1	4	08:00-08:15	68	69	137	02:00-02:15	83	72	155	08:00-08:15	33	17	50
02:15-02:30	2	0	2	08:15-08:30	68	39	107	02:15-02:30	76	87	163	08:15-08:30	26	24	50
02:30-02:45	5	1	6	08:30-08:45	71	43	114	02:30-02:45	99	100	199	08:30-08:45	21	16	37
02:45-03:00	3	0	3	08:45-09:00	69	44	113	02:45-03:00	99	97	196	08:45-09:00	38	15	53
03:00-03:15	2	3	5	09:00-09:15	63	51	114	03:00-03:15	84	125	209	09:00-09:15	23	20	43
03:15-03:30	1	0	1	09:15-09:30	66	54	120	03:15-03:30	101	103	204	09:15-09:30	16	15	31
03:30-03:45	4	0	4	09:30-09:45	67	64	131	03:30-03:45	88	102	190	09:30-09:45	19	17	36
03:45-04:00	4	1	5	09:45-10:00	65	82	147	03:45-04:00	85	.02	182	09:45-10:00	14	20	34
04:00-04:15	9	3	12	10:00-10:15	50	65	115	04:00-04:15	119	100	219	10:00-10:15	13	_0	19
04:15-04:30	6	3	9	10:15-10:30	51	64	115	04:15-04:30	102	101	203	10:15-10:30	20	7	27
04:30-04:45	5	7	12	10:30-10:45	62	82	144	04:30-04:45	106	1/9	255	10:30-10:45	20	12	19
04:45-05:00	11	2	12	10:45-11:00	73	87	160	04:45-05:00	96	138	234	10:45-11:00	15	7	22
04.45-05.00	11	2	14	11:00 11:15	73	76	149	04.45-05.00	90 79	130	177	11:00 11:15	13	6	12
05.00-05.15	10		04	11.15 11.20	72	70	140	05.00-05.15	100	33 70	100	11.15 11.00	14	0	10
05:15-05:30	13	11	24	11:10-11:30	79 77	78	157	05:15-05:30	108	105	100	11:15-11:30	14	0	20
05:30-05:45	9 16	4	13	11:30-11:45	78	78 73	100	05:30-05:45	79	74	164	11:30-11:45	13	0 7	19
03.43-00.00	10	7	23	11.45-12.00	70	75	151	03.43-00.00	09	74	103	11.45-12.00	9	1	10
		D (05:00-09:00	0) C	DIR 1	DI	R 2		PM COMM	JTER PER	IOD (15:00-1	9:00)	DIR 1		DIR 2	
I WO DIREC		EAK		07.00.414	~~ ~~ ~ ~ ~			IWODIR				04.00			
			~	07:30 AM to	0 08:30 AM	0	402	PM -				402		100 F IVI	011
			2	202	23	U	492 5 60	PM -				423		400	911 10.97
	AUTUR (% %/ )	(0)	-	2 25	40	75	100.00	PIVI -		1 (70)		46.42		52 57	10.37
	AL DEAK		5	0.20	40	.75	100.00			k		40.40		33.37	100.00
			c	9.00 AM to 00.00		15 AM to 0	9.15 AM					04:00 PM to 05		04.00 DM+	0.05.00 PM
AM - PE			2	276	23	1	0.15 AM	PM - I				423	.00110	488	0 00.00 1 10
			L		20	1			(10:00.04			420		+00	
AM PERIOD ((	00:00-12:00	U)							) (12:00-24	:00)					
TWO DIREC		EAK						IWODIR							
AM - PE	AK HR I'M		-	10:45 AM to	0 11:45 AM	0	<u></u>	PM -				04:00	PM to 0	5:00 PM	011
AM - PE			3	301	31	Э	620 7.06	PM -				423		488	911
	-AUTUR (% %/ )	(0)		19 55	E 4	45	100 00	PIVI -		u (70)		46.42		52 57	10.37
			4	6.33	51	.40	100.00					40.43	D O	03.5/ Tatal	100.00
NON-COMMU	IER PERI	OD (09:00-15:	:00)					6-HR, 12-H	к, 24-НК F	FRIODS		ואוט DI	К2	Iotal	
TWO DIREC	TIONAL PI	EAK						AM 6-HR	PERIOD (0	06:00-12:00)		1,488 1,3	324	2,812	
PEAK H	IR TIME			02:00 PM to	03:00 PN	1		AM 12-HF	R PERIOD	(00:00-12:00)	)	1,622 1,3	386	3,008	
PEAK H	IR VOLUM	E	3	357	35	6	713	PM 6-HR	PERIOD (1	12:00-18:00)		2,122 2,3	320	4,442	
DIRECTION	AL PEAK							PM 12-HF	R PERIOD	(12:00-24:00)	)	2,772 3,0	007	5,779	
PEAK H	HR TIME		C	2:00 PM to 03:00	) PM 12	:00 PM to 0	1:00 PM	24 HOUR	PERIOD			4,394 4,3	393	8,787	
PEAK H	HR VOLUM	IE	3	357	36	6		D (%)				50.01 49	.99	100.00	

# HDOT RIMS Traffic Station Analyzer (v48)

RS

Run Date: 24-MAR	-22				State of	Hawaii, Dep	oartment of 15 Minute \	Transportation, High /olume Report	ways Divisi	on					
Site ID: B71277000 Functional Class: U Location:	332 IRBAN:COLLEC	TOR				Town: Hav Count Typ DATE: 18-	waii e: CLASS SEP-19	DIR 1 Count	: +MP ter Type: Tube	þ	DIR	<b>2:</b> -MP	Final AADT: 9 Route No: 27	9500 70	
AM COMMUTER PI	RIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIO	D (15:00-19:00	))	DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							TWO DIRECTIONAL PE	AK						
AM - PEAK HR T			251	30 to 08:30 AM		910		PM - PEAK HR TIME	40		04:15 to	05:15 PM		1.006	
AM - K FACTOR	%)		551	400		7.52		PM - K FACTOR(%)	VIE		470	520		9.23	
AM - D(%)			42.86	57.14		100		PM -D(%)			47.51	52.49		100	
DIRECTIONAL PEA	АK							DIRECTIONAL PEAK							
AM - PEAK HR T	IME		07:45 to 08:4	45 AM 07:30 to 0	08:30 AM			PM - PEAK HR TIME			03:45 to 04:45 PN	A 04:15 to 05:1	15 PM		
AM - PEAK HR V	OLUME		360	468				PM - PEAK HR VOLUN	ME		497	528			
AM PERIOD (00:00	- <b>12:00)</b> Al PEAK		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0 TWO DIRECTIONAL PE	<b>0)</b> Ak		DIR 1	DIR 2		TOTAL	
AM - PEAK HR T	IME		07:	30 to 08:30 AM				PM - PEAK HR TIME			04:15 to	05:15 PM			
AM - PEAK HR V	OLUME		351	468		819		PM - PEAK HR VOLUM	ИE		478	528		1,006	
AM - K FACTOR(	%)					7.52		PM - K FACTOR(%)						9.23	
AM - D(%)			42.86	57.14		100		PM -D(%)			47.51	52.49		100	
NON COMMUTER	PERIOD (09:00	0-15:00)	DIR 1	DIR 2		TOTAL		6-HR, 12-HR, 24-HR PE	RIODS		DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							AM 6-HR PERIOD (06:0	0-12:00)		1,857	2,172		4,029	
PEAK HR TIME			02:	30 to 03:30 PM				AM 12-HR PERIOD (00	:00-12:00)		2,040	2,359		4,399	
PEAK HR VOLUN	1E		398	435		833		PM 6-HR PERIOD (12:0	0-18:00)		2,406	2,658		5,064	
DIRECTIONAL PEA	АК		02:20 to 02:2	20 DM 01:00 to (	0.00 DM			PM 12-HR PERIOD (12:	:00-24:00)		3,046	3,449		6,495	
	1F		398	20 PINI 01:00 to 0 243	J2:00 PIVI			24-HR PERIOD (12:00-2	24:00)		5,086 46.69	5,808		10,894	
			550					0.0			40.05	55.51		100	
TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIP1		TOTAL		DID1	DID 0					
12:00 - 12:15	-				DIKI	DIK 2	TOTAL	TIME - PM	DIKI	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
10.15 10.00	5	5	10	06:00 - 06:15	29	40	69	12:00 - 12:15	104	DIR 2 107	211	TIME - PM 06:00 - 06:15	DIR1 64	DIR 2 70	<b>TOTAL</b> 134
12:15 - 12:30	5	5 5	10 12	06:00 - 06:15 06:15 - 06:30	29 64	40 59	69 123	TIME - PM           12:00 - 12:15           12:15 - 12:30	104 96	107 100	211 196	TIME - PM 06:00 - 06:15 06:15 - 06:30	DIR1 64 63	<b>DIR 2</b> 70 100	<b>TOTAL</b> 134 163
12:15 - 12:30	5 7 6	5 5 10	10 12 16	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45	29 64 60	40 59 59	69 123 119	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45	104 96 81	107 100 113	<b>TOTAL</b> 211 196 194	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45	DIR1 64 63 63	DIR 2 70 100 70	<b>TOTAL</b> 134 163 133
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00	5 7 6 2	5 5 10 4	10 12 16 6	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00	29 64 60 55	40 59 59 70	69 123 119 125	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00	104 96 81 97	107 100 113 86	TOTAL           211           196           194           183	TIME - PM           06:00 - 06:15           06:15 - 06:30           06:30 - 06:45           06:45 - 07:00	DIR1 64 63 63 40	DIR 2 70 100 70 71	TOTAL 134 163 133 111
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15	5 7 6 2 2	5 5 10 4 4	10 12 16 6 6	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15	29 64 60 55 79	40 59 59 70 77	101AL 69 123 119 125 156	TIME - PM 12:00 - 12:15 12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15	104 96 81 97 93	107 100 113 86 98	TOTAL           211           196           194           183           191	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15	DIR1 64 63 63 40 43	DIR 2 70 100 70 71 55	TOTAL 134 163 133 111 98
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30	5 7 6 2 2 1	5 5 10 4 4 9	10 12 16 6 6 10	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30	29 64 60 55 79 69	40 59 59 70 77 87	69 123 119 125 156 156	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30	104 96 81 97 93 87	107 100 113 86 98 117	TOTAL           211           196           194           183           191           204	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30	DIR1 64 63 63 40 43 37	DIR 2 70 100 70 71 55 43	TOTAL 134 163 133 111 98 80
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45	5 7 6 2 2 1 5	5 5 10 4 9 7	10 12 16 6 6 10 12	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45	29 64 60 55 79 69 91	40 59 59 70 77 87 126	69 123 119 125 156 156 217	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45	104 96 81 97 93 87 97	Dik 2 107 100 113 86 98 117 121	TOTAL 211 196 194 183 191 204 218 208	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45	DIR1 64 63 63 40 43 37 34	DIR 2 70 100 70 71 55 43 38	TOTAL 134 163 133 111 98 80 72
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00	5 7 6 2 2 1 5 2	5 5 10 4 9 7 7	10 12 16 6 10 12 3	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00	29 64 60 55 79 69 91 79	40 59 59 70 77 87 126 122	69 123 119 125 156 156 217 201	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00	Dik1 104 96 81 97 93 87 97 93	DR 2 107 100 113 86 98 117 121 107	TOTAL 211 196 194 183 191 204 218 200 100	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 07:00 - 0.045	DIR1 64 63 63 40 43 37 34 34	DIR 2 70 100 70 71 55 43 38 47 25	TOTAL 134 163 133 111 98 80 72 81
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 01:45 - 02:20	5 7 6 2 2 1 5 2 4	5 5 10 4 9 7 7 1 6	10 12 16 6 10 12 3 10	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 09:15 - 07:20	29 64 60 55 79 69 91 79 86	Jik 2           40           59           59           70           77           87           126           122           106	IOTAL           69           123           119           125           156           217           201           192	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15	Dikt 104 96 81 97 93 87 97 93 93 107	Dik 2 107 100 113 86 98 117 121 107 92 00	TOTAL           211           196           194           183           191           204           218           200           199           100	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 09:15 - 09:20	DIR1 64 63 63 40 43 37 34 34 34 25	DIR 2 70 100 70 71 55 43 38 47 36 27	TOTAL 134 163 133 111 98 80 72 81 76 76 71
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45	5 7 6 2 2 1 5 2 4 3 3	5 5 10 4 9 7 1 6 6 1	10 12 16 6 10 12 3 10 4	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30	29 64 60 55 79 69 91 79 86 95	Jik 2           40           59           59           70           77           87           126           122           106           114           70	69 123 119 125 156 217 201 192 209 170	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:15 - 02:30	Dikt 104 96 81 97 93 87 97 93 107 81	Dik 2 107 100 113 86 98 117 121 107 92 99 110	TOTAL           211           196           194           183           191           204           218           200           199           180	TIME - PM           06:00 - 06:15           06:15 - 06:30           06:30 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:45 - 08:00           08:00 - 08:15           08:15 - 08:30	DIR1 64 63 63 40 43 37 34 34 34 40 25 28	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26	TOTAL 134 163 133 111 98 80 72 81 76 51 68
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 02:00	5 7 6 2 2 1 5 2 4 3 0 0	5 5 10 4 9 7 1 6 6 1 9 9	10 12 16 6 10 12 3 10 4 9 9	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 08:00	29 64 60 55 79 69 91 79 86 95 100 74	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72	101AL 69 123 119 125 156 217 201 192 209 179 146	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:45 - 02:00	Dik1 104 96 81 97 93 87 97 93 107 81 101 102	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115	TOTAL 211 196 194 183 191 204 218 200 199 180 211 217	TIME - PM 06:00 - 06:15 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00	DIR1 64 63 40 43 37 34 34 40 25 28 20	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 26 40	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15	5 7 6 2 2 1 5 2 4 3 0 4 4	5 5 10 4 4 9 7 1 6 1 9 6 6 6	10 12 16 6 10 12 3 10 4 9 10	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15	29 64 60 55 79 69 91 79 86 95 100 74	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80	IOTAL           69           123           119           125           156           156           201           192           209           179           146	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:35 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:30 - 02:45           02:30 - 02:45           02:45 - 03:00           02:30 - 02:45	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102	TOTAL 211 196 194 183 191 204 218 200 199 180 211 217 196	TIME - PM 06:00 - 06:15 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15	DIR1 64 63 40 43 37 34 40 25 28 20 20 22	DIR 2 70 100 70 71 55 43 38 47 36 26 40 25 15	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30	5 7 6 2 2 1 5 2 4 3 0 4 4 4 7	5 5 10 4 9 7 7 1 6 1 9 6 6 6 6	10 12 16 6 10 12 3 10 4 9 10 10 10	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30	29 64 60 55 79 69 91 79 86 95 100 74 74 68	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80 90	IOTAL           69           123           119           125           156           156           201           192           209           179           146           154           158	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:30 - 02:45           02:30 - 02:45           03:00 - 03:15           03:01 - 03:15	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101	DIR 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30	DIR1 64 63 40 43 37 34 43 4 40 25 28 20 22 22 25	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 40 25 15 15 27	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45	5 7 6 2 2 1 5 5 2 4 3 0 4 4 4 4 7 6	5 5 10 4 9 7 1 6 1 9 6 6 6 6 6	10 12 16 6 10 12 3 10 4 9 10 10 10 13 9	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 78	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80 90 90 86	IOTAL           69           123           119           125           156           156           201           192           209           179           146           154	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:30 - 02:45           02:30 - 02:45           03:00 - 03:15           03:00 - 03:15           03:00 - 03:45	Dik1 104 96 81 97 93 87 93 107 81 101 102 94 101 91	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45	DIR1 64 63 40 43 37 34 43 40 25 28 20 22 25 25 13	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 40 25 15 5 15 27 23	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 36
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:315 - 03:30 03:30 - 03:45 - 04:00	5 7 6 2 2 1 5 5 2 4 3 0 4 4 4 4 7 6 10	5 5 10 4 9 7 7 1 6 6 6 6 6 6 3 7	10 12 16 6 10 12 3 10 4 9 10 10 10 13 9 17	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 78 83	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80 90 90 86 102	IOTAL           69           123           119           125           156           156           201           192           209           179           146           154           158           164           185	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:30 - 02:45           02:45 - 03:00           03:00 - 03:15           03:15 - 03:30           03:45 - 03:40	Dik1 104 96 81 97 93 87 93 107 81 101 102 94 101 91 124	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00	DIR1 64 63 40 43 37 34 43 40 25 28 20 22 25 28 20 22 13 32 23	DIR 2 70 100 70 71 55 43 38 43 38 43 38 47 26 26 40 25 15 27 23 22	TOTAL 134 163 133 111 98 80 72 81 72 81 76 51 68 45 37 52 36 45
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15	5 7 6 2 2 1 5 2 4 3 0 4 4 4 7 7 6 10	5 5 10 4 9 7 7 1 6 6 6 6 6 6 3 7 6	10 12 16 6 10 12 3 10 4 9 10 10 10 10 13 9 77	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 78 83 83	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80 90 86 86 102 95	IOTAL           69           123           119           125           156           156           201           192           209           179           146           158           164           185           178	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           02:45 - 03:00           03:00 - 03:15           03:15 - 03:30           03:30 - 03:45           03:45 - 04:00           04:15	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222	TIME - PM 06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15	DIR1 64 63 40 43 37 34 34 40 25 28 20 22 25 13 23 12	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 40 25 5 15 27 23 22 22 13	TOTAL 134 163 133 111 98 80 72 81 72 81 76 51 68 45 37 52 36 45 37 52 36 45 25
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30	5 7 6 2 2 1 5 2 4 3 0 4 4 3 0 4 4 7 6 10 11 4	5 5 10 4 9 7 1 6 1 9 6 6 6 6 6 3 7 7 6 9	10 12 16 6 10 12 3 10 4 9 10 10 10 10 13 9 17 17 17	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15 10:15 - 10:30	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 78 83 83 83 73	Dik 2 40 59 70 77 87 126 122 106 114 79 72 80 90 86 80 90 86 102 95 82	IOTAL           69           123           119           125           156           217           201           192           209           179           146           158           164           178           178           155	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           02:45 - 03:00           03:00 - 03:15           03:15 - 03:30           03:345 - 04:00           04:15 - 04:30	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120 124	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102 116	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222           240	TIME - PM           06:00 - 06:15           06:30 - 06:45           06:30 - 06:45           06:45 - 07:00           07:00 - 07:15           07:30 - 07:45           07:30 - 07:45           08:00 - 08:15           08:30 - 08:45           08:30 - 08:45           09:00 - 09:15           09:00 - 09:15           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:15 - 10:30	DIR1 64 63 63 40 43 37 34 440 25 28 20 22 25 13 23 12 9	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 40 25 5 5 27 23 22 23 22 21 3 13	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 366 45 36 45 55 25 20
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30 04:30 - 04:45	5 7 6 2 2 1 5 2 4 3 0 4 4 3 0 4 4 7 6 10 11 11 4 10	5 5 10 4 9 7 1 6 6 6 6 6 6 6 6 3 7 7 6 9 11	10 12 16 6 10 12 3 10 4 9 10 10 10 10 10 13 9 17 17 17 13 21	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15 10:15 - 10:30 10:30 - 10:45	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 78 83 83 83 73 72	Dik 2 40 59 70 77 87 126 122 106 114 79 72 80 90 86 102 95 82 94	IOTAL           69           123           119           125           156           217           201           192           209           179           146           158           164           185           178           155           166	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           02:45 - 03:00           03:00 - 03:15           03:15 - 03:30           03:30 - 03:45           03:45 - 04:00           04:15 - 04:15           04:15 - 04:30           04:30 - 04:45	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120 124 129	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102 102 104 144	TOTAL 211 196 194 183 191 204 218 200 199 180 211 217 196 209 176 239 222 240 273	TIME - PM           06:00 - 06:15           06:15 - 06:30           06:31 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:30 - 07:45           08:00 - 08:15           08:30 - 08:45           08:30 - 08:45           08:45 - 09:00           09:00 - 09:15           09:15 - 09:30           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:15 - 10:30           10:30 - 10:45	DIR1 64 63 63 40 43 77 34 43 40 25 28 20 22 25 13 23 12 9 6	DIR 2 70 100 70 71 55 43 38 47 36 26 40 25 15 27 23 22 13 11 14	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 36 45 37 52 36 45 25 20 20 20
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30	5 7 6 2 2 1 5 2 4 3 0 4 4 3 0 4 4 7 6 10 11 11 4 10 15	5 5 10 4 9 7 1 1 6 1 9 6 6 6 6 6 6 3 7 7 6 9 9 11 13	10 12 16 6 10 12 3 10 4 9 10 10 10 10 10 10 10 10 13 9 17 17 17 13 21 28	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:30 - 10:45 10:45 - 11:00	29 64 60 55 79 69 91 79 86 95 100 74 74 74 68 83 83 83 83 83 73 72 98	Dik 2 40 59 59 70 77 87 126 122 106 114 79 72 80 90 86 102 95 82 94 90	IOTAL           69           123           119           125           156           217           201           192           209           179           146           158           164           185           178           155           166           188	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           02:45 - 03:00           03:00 - 03:15           03:15 - 03:30           03:30 - 03:45           03:45 - 04:00           04:15 - 04:30           04:30 - 04:45           04:45 - 05:00	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120 124 129 104	Dik 2 107 100 113 86 98 117 121 107 92 99 99 99 110 115 102 108 85 115 102 108 85 115 102 116 144 148	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222           240           273           252	TIME - PM           06:00 - 06:15           06:15 - 06:30           06:31 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:45 - 88:00           08:00 - 08:15           08:30 - 08:45           08:30 - 08:45           08:45 - 09:00           09:00 - 09:15           09:15 - 09:30           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:15 - 10:30           10:30 - 10:45           10:45 - 11:00	DIR1 64 63 63 40 43 77 34 43 40 25 28 20 22 25 13 23 12 9 6 7	DIR 2 70 100 70 71 55 43 38 43 38 47 36 26 26 40 25 5 5 27 23 22 23 22 23 13 11 11 14 9	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 36 45 37 52 36 45 25 20 20 20 16
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 01:45 - 02:00 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30 04:30 - 04:45 04:45 - 05:00 05:00 - 05:15	5 7 6 2 2 1 5 2 4 3 0 4 4 3 0 4 4 7 6 10 11 1 1 4 10 15 18	5 5 10 4 9 7 1 6 1 1 9 6 6 6 6 6 6 6 6 3 7 7 6 9 9 11 13 11	10 12 16 6 10 12 3 10 4 9 10 10 10 10 13 9 17 17 17 17 13 21 28 29	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15 10:45 - 11:00 11:00 - 11:15	29 64 60 55 79 69 91 79 86 95 100 74 74 68 78 83 83 83 83 73 72 98 94	Dik 2 40 59 70 77 87 126 122 106 114 79 72 80 90 86 102 95 82 94 90 123	IOTAL           69           123           119           125           156           217           201           192           209           179           146           154           158           164           185           178           155           166           188           217	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 01:30           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           03:00 - 03:15           03:15 - 03:30           03:30 - 03:45           03:45 - 04:00           04:00 - 04:15           04:15 - 04:30           04:30 - 04:45           04:45 - 05:00           05:00 - 05:15	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120 124 129 104 121	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102 108 85 115 102 116 144 148 120	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222           240           273           252           241	TIME - PM           06:00 - 06:15           06:30 - 06:45           06:32 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:45 - 88:00           08:00 - 08:15           08:30 - 08:45           08:30 - 08:45           08:30 - 09:15           09:15 - 09:30           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:30 - 10:45           10:30 - 10:45           10:45 - 11:00           11:00 - 11:15	DIR1 64 63 63 40 43 77 34 43 40 25 28 20 22 25 13 23 12 9 6 7 9	DIR 2 70 100 70 71 55 43 38 43 47 36 26 40 25 15 27 23 22 13 11 14 9 9 9	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 36 45 25 20 20 20 16 18
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30 04:30 - 04:45 04:45 - 05:00 05:00 - 05:15 05:15 - 05:30	5 7 6 2 2 1 5 2 4 3 0 4 3 0 4 4 7 6 10 11 1 4 10 15 18 16	5 5 10 4 9 7 1 6 1 1 9 6 6 6 6 3 7 7 6 9 9 11 13 11 12	10 12 16 6 10 12 3 10 4 9 10 10 10 10 13 9 17 17 17 13 21 28 29 28	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15 10:15 - 10:30 10:30 - 10:45 11:00 - 11:15 11:15 - 11:30	29 64 60 55 79 69 91 79 86 95 100 74 74 68 78 83 83 83 83 73 72 98 94 96	Dik 2 40 59 59 70 77 87 126 122 106 112 122 106 114 79 72 80 90 86 102 95 82 94 90 123 99	101AL           69           123           119           125           156           217           201           192           209           179           146           154           158           164           185           178           155           166           188           217           195	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           03:00 - 03:15           03:15 - 03:30           03:30 - 03:45           03:45 - 04:00           04:00 - 04:15           04:35 - 05:00           05:00 - 05:15           05:15 - 05:30	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 91 124 120 124 129 104 121 102	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102 108 85 115 102 116 144 148 120 111	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222           240           273           252           241           213	TIME - PM           06:00 - 06:15           06:30 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:45 - 08:00           08:00 - 08:15           08:30 - 08:45           08:30 - 08:45           08:30 - 09:45           09:15 - 09:30           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:30 - 10:45           10:45 - 11:00           11:00 - 11:15           11:15 - 11:30	DIR1 64 63 63 40 43 77 34 43 40 25 28 20 22 25 13 23 12 9 6 7 9 9 9 9 9 9	DIR 2 70 100 70 71 55 43 38 43 47 36 26 40 25 15 27 23 22 13 11 14 9 9 9 10	TOTAL 134 163 133 111 98 80 72 81 76 51 68 45 37 52 36 45 25 20 20 20 16 18 19
12:15 - 12:30 12:30 - 12:45 12:45 - 01:00 01:00 - 01:15 01:15 - 01:30 01:30 - 01:45 02:00 - 02:15 02:00 - 02:15 02:15 - 02:30 02:30 - 02:45 02:45 - 03:00 03:00 - 03:15 03:15 - 03:30 03:30 - 03:45 03:45 - 04:00 04:00 - 04:15 04:15 - 04:30 04:30 - 04:45 04:45 - 05:00 05:00 - 05:15 05:15 - 05:30 05:30 - 05:45	5 7 6 2 2 1 5 2 4 3 0 4 3 0 4 4 7 6 10 11 1 4 10 15 18 16 17	5 5 10 4 9 7 1 6 6 6 6 6 6 6 6 6 9 11 13 11 11 12 13	10 12 16 6 10 12 3 10 4 9 10 10 10 10 10 13 9 17 17 17 13 21 28 29 28 29 28 30	06:00 - 06:15 06:15 - 06:30 06:30 - 06:45 06:45 - 07:00 07:00 - 07:15 07:15 - 07:30 07:30 - 07:45 07:45 - 08:00 08:00 - 08:15 08:15 - 08:30 08:30 - 08:45 08:45 - 09:00 09:00 - 09:15 09:15 - 09:30 09:30 - 09:45 09:45 - 10:00 10:00 - 10:15 10:15 - 10:30 10:30 - 10:45 11:10 - 11:15 11:15 - 11:30 11:30 - 11:45	29 64 60 55 79 69 91 79 86 95 100 74 74 68 78 83 83 83 73 72 98 94 96 85	Dik 2 40 59 59 70 77 87 126 122 106 112 122 106 114 79 72 80 90 72 80 90 86 102 95 82 94 90 123 99 90 116	IOTAL           69           123           119           125           156           217           201           192           209           179           146           154           158           164           185           178           201           192           209           179           164           185           164           185           166           188           217           195           201	TIME - PM           12:00 - 12:15           12:15 - 12:30           12:30 - 12:45           12:30 - 12:45           12:45 - 01:00           01:00 - 01:15           01:15 - 01:30           01:30 - 01:45           01:45 - 02:00           02:00 - 02:15           02:15 - 02:30           02:30 - 02:45           03:45 - 03:00           03:30 - 03:45           03:45 - 04:00           04:00 - 04:15           04:15 - 04:30           04:45 - 05:00           05:15 - 05:30           05:15 - 05:30           05:15 - 05:30	Dik1 104 96 81 97 93 87 97 93 107 81 101 102 94 101 102 94 101 124 120 124 129 104 121 102 83	Dik 2 107 100 113 86 98 117 121 107 92 99 110 115 102 108 85 115 102 108 85 115 102 106 144 148 120 111	TOTAL           211           196           194           183           191           204           218           200           199           180           211           217           196           209           176           239           222           240           273           252           241           213           232	TIME - PM           06:00 - 06:15           06:30 - 06:45           06:30 - 06:45           06:45 - 07:00           07:00 - 07:15           07:15 - 07:30           07:30 - 07:45           07:45 - 08:00           08:00 - 08:15           08:30 - 08:45           08:45 - 09:00           09:00 - 09:15           09:15 - 09:30           09:30 - 09:45           09:45 - 10:00           10:00 - 10:15           10:30 - 10:45           10:30 - 10:45           10:30 - 11:45           11:00 - 11:15           11:15 - 11:30           11:30 - 11:45	DIR1 64 63 40 43 37 34 40 25 28 20 20 22 25 13 223 12 9 6 7 9 9 9 11	DIR 2 70 100 70 71 55 43 38 43 47 36 26 40 25 15 27 23 22 13 11 14 9 9 9 100 8	TOTAL 134 133 133 111 98 80 72 81 76 51 68 45 37 52 36 45 25 20 20 20 20 16 18 19 19

HDOT RIMS Traffic Station Analyzer (v48)

release 48 Set Screen Reader Mode On
Bit Bit ZUCKNEK Burdenside Bit Structure And Structure Bit Bit Bit Bit Bit Bit Bit Bit Bit Bit	Run Date: 24-MAR	R-22				State of	Hawaii, Dep	partment of 15 Minute	Transportation, High Volume Report	nways Divis	ion					
Non-Network     Note-Network     N	Site ID: B71277000 Functional Class: U Location:	0332 URBAN:COLLEC	TOR				Town: Ha Count Typ DATE: 19-	waii 9e: CLASS - <b>SEP-19</b>	DIR 1 Coun	I: +MP I <b>ter Type:</b> Tub	e	DIR 2	<b>2:</b> -MP	Final AADT: 9 Route No: 27	9500 '70	
No. Procession 2000         Diff         Procession 2000         Procession 2000<	AM COMMUTER P	PERIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIO	D (15:00-19:0	0)	DIR 1	DIR 2		TOTAL	
Math And Field (Math Field (Mat	TWO DIRECTION	IAL PEAK							TWO DIRECTIONAL PE	AK		00.00				
AM         DBA         BD	AM - PEAK HR I			210	15 to 08:15 AM		705		PM - PEAK HR TIME			03:00 to	04:00 PM		05.0	
M. 100         M. 201         94.91         100         M. 200         45.71         4.99         100           M. PAC HR TINE         Bib to 93.0 AU         A775 to Bit 1 AU         M. PAC HR TINE         Bib to 90.0 AU         AV         Bib to 90.0 AU		VOLUME		318	467		785 8.05		PIVI - PEAK HR VOLU	IVIE		437	519		950	
Differ (Dirat. Park AM - FEAK HE TWALE AM - FEA	AM - D(%)	.(70)		40 51	59.49		100		PM -D(%)			45 71	54 29		100	
AM         PAX	DIRECTIONAL PE	AK		10.51	55.15		100		DIRECTIONAL PEAK			15.7 1	51125			
AM         FAX.HR VCLUME         20         47         PM PRACHR VCLUME         42         59           INSIGNET.COM, FAX, M, FAX.HR VCLUME         NI         Value 124.57 PK         Value 124.57 PK<	AM - PEAK HR 1	TIME		08:30 to 09:3	30 AM 07:15 to	08:15 AM			PM - PEAK HR TIME			03:15 to 04:15 PM	03:00 to 04:0	00 PM		
AP FERADD (d8x6-12:30) TheO DIRCTONUM FERA AM - PKX (FRVOUNDE AM - PKX) (FRVOUNDE AM - PKX (FRVOUNDE AM	AM - PEAK HR \	VOLUME		320	467				PM - PEAK HR VOLU	ME		462	519			
The Direct rowal, Park         That Sub 1245 PM         That Sub 12	AM PERIOD (00:00	D-12:00)		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0	)0)		DIR 1	DIR 2		TOTAL	
All right in line:         1175 0 1/25 PM         117	TWO DIRECTION	IAL PEAK			45 · 10 45 DM				TWO DIRECTIONAL PE	EAK		02.45.	02 45 DI 4			
A.H. F.K. TACHONING         9.01         B.M.         B.M.         F.K. F.K. TOCHONING         H. H.         9.00         JUS           M.H. DOB)         M.S.         59.49         100         PM - F.K. TOCHONING         45.71         54.29         1002           M.H. DOB)         M.S.         59.49         100         PM - F.K. TOCHONING         45.71         54.29         1002           TWO COMMUTER PERIOD (0500-1500)         DIR 1         DIR 2         TOTAL         AM - F.R. REDOD (0500-1200)         1.770         2.156         33.26				201	45 to 12:45 PM		926			мг		02:45 to	03:45 PM		077	
MX - D(t)         MA - D(t)         94.91		VOLUME		381	445		820		PIVI - PEAK HR VOLU	IVIE		414	503		977	
DOX COMMUTER PERIOD (09:00-15:00) TWO DIRECTIONAL PEAK PEAK IR WOLLME         DIR 1         DIR 2         TOTAL         6-HR, 12-HR, 24-HR PERIOD (00:00-120) AM 12-HR PERIOD (10:00-200) DIRECTIONAL PEAK         DIR 1         DIR 2         TOTAL           PEAK IR MULIME PEAK IR WOLLME         414         563         977         AM 64 HR PERIOD (10:00-200) AM 12-HR PERIOD (10:00-200) DIRECTIONAL PEAK         1,770         2,156         3,326           DIRCT TO ALL FRAK PEAK IR WOLLME         414         563         977         M6 41R PERIOD (10:00-200) DIR         3,480         1,480         5,426           DIRCT TO ALL FRAK PEAK IR WOLLME         414         563         977         TOTAL         TIME -PM         DIR 1         DIR 2         2,368         1,200         4,288           DIRCT TO ALL FRAK         118         0245 to 03.45 PM         0245 to 03.45 PM         0245 to 03.45 PM         0181         DIR 2         1080         0180         0180         0180         0180         0180         0180         0180         0180         0180         0181         DIR 2         1070L         115         0181         DIR 2         1070L         118         1102         0181         0182         1070L         118         113         229         0640-070         0180         0181         0182         10	AM - D(%)	(70)		40.51	59.49		100		PM -D(%)			45.71	54.29		10.02	
NON COMMUTE FERICO QUESO 1-500         DIR 1         DIR 2         TOTAL         FUR. 1-4R, 2-4R, PERICO S         DIR 1         DIR 2         TOTAL           PEAK HR TIME         0.245 to 0.345 PM         563         977         PM 6-4R, PERICO (10.00-01-200)         3.266         3.286         3.236         4.320         4.320           PEAK HR TIME         0.245 to 0.345 PM         0.245 to 0.345 PM         0.245 to 0.345 PM         2.245         5.38         1.246         5.426         4.340         5.426         4.340         5.426         4.346         5.51         5.77         5.77         5.77 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>																
TWD DIRCELTIONAL PEAK         DEAK IS MEX         AME -IMP REPRIOD (06:00-12:00)         1.7.0         2.7.56         3.926           PEAK, HR VOLUME         4.14         5.63         977         M1 -IMP REPRIOD (06:00-12:00)         2.368         1.320         4.288           PEAK, HR VOLUME         0.245 to 0.345 PM         0.245 to 0.345 PM         0.245 to 0.345 PM         0.245 to 0.345 PM         3.480         3.480         3.480         3.480         1.946         5.425         9.746           PEAK, HR VOLUME         414         5.63         070 - 075         5.62         4.234         9.746           1215 - 1230         2         1         3.3         644         120 - 1215         91         104         195         0600 - 06:15         64         1         651           1225 - 1230         2         1         3         1         4         060 - 06:15         63         114         1220 - 12:15         91         104         195         0600 - 06:15         64         10         651           1225 - 1230         18         3         1         4         0600 - 06:15         64         121         1230 - 1245         116         113         129         0630 - 06:45         70         0	NON COMMUTER	PERIOD (09:00	0-15:00)	DIR 1	DIR 2		TOTAL		6-HR, 12-HR, 24-HR PE	RIODS		DIR 1	DIR 2		TOTAL	
PEAK IR IUM         Lass to bished PM         AM 12-HR PRIDO (0000-12.00)         1.972         2.348         4.520           DIRECTONAL PEAK         563         577         PM 4-HR PRIDO (12:02-24:00)         3.480         1.946         5.422           VEAK HR VOLUME         414         563         0245 to 0345 PM         0446         0464           1200 - 1215 013         1         1         0450 - 0600 PM         1<1<1<1145 + 1110 PM	TWO DIRECTION	IAL PEAK							AM 6-HR PERIOD (06:	00-12:00)		1,770	2,156		3,926	
PHAR MOUDINE         414         30         977         PM Is HR PROUD (12:00-24:00)         2.388         1.32.0         4.288           PEAK IRV LIPEK         02.45 to 03.45 PM         02.44 PM PRIAD (12:00-24:00)         3.60 0         1.562         4.234         97.6           TIME - AM         DiRt         <	PEAK HR TIME			02:	45 to 03:45 PM		077		AM 12-HR PERIOD (00	):00-12:00)		1,972	2,348		4,320	
PEAK RY NULL         Q245 to 03.45 PM				414	203		977		PIVI 6-HK PERIOD (12:0	JU-18:00)		2,308	1,920		4,288	
PEAK HR VOLUME         114         53         TIME - AM         D/K         55.94         44.06         100           TIME - AM         D/R1         D/R2         TOTAL         TIME - AM         D/R1         D/R2         TOTAL         TIME - PM         D/R1         D/R2         TOTAL         TIME - AM         D/R1         D/R2         TOTAL         TIME - AM         D/R1         D/R2         TOTAL         TIME - PM         D/R1         D/R2         TOTAL         TIME - AM         D/R1         D/R2         D/R2<	PEAK HR TIME	AK		02:45 to 03:4	15 PM 02:45 to	03·45 PM			24-HR PERIOD (12-00-	.24.00)		5,460	4 294		9746	
TIME - AM         DIR1         DIR2         TOTAL         TIME - AM         DIR1         DIR2         TOTAL         TIME - PM         DIR1         DIR3         DIR1         DIR3         DIR3 <thdir3< th="">         DIR3         DIR3</thdir3<>	PEAK HR VOLU	ME		414	563	00.40110			D%	24.00)		55.94	44.06		100	
TME-MDIR2DIR2TME-MDIR2DTM2TME-MDIR1DIR2TME-MDIR2	-															
12:0 - 12:15         6         99         15         0600 - 06:15         33         31         64         12:0 - 12:15         91         104         195         06:00:05:15         64         1           12:15 - 12:30         2         1         3         06:15 - 06:30         S7         64         121         12:15 - 12:30         88         106         131         229         06:63 - 06:45         80         70         700         700         700         54         60         114         12:45 - 10:00         89         96         185         06:63 - 06:45         70         56         50           01:00 - 01:15         6         6         7000 - 07:15         66         68         171         01:15 - 01:30         70         115         185         07:15 - 07:30         64         0         57           01:15 - 01:30         4         4         8         07:15 - 07:30         72         105         177         01:15 - 01:30         104         211         07:30 - 07:45         67         0         67           01:15 - 01:30         1         1         07:30 - 07:45         87         165         114         104         115         07:30 - 07:45         67	TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:15 - 12:30         2         1         3         06:15 - 06:30         657         64         121         12:15 - 12:30         88         105         193         06:15 - 06:30         81         00         87           12:30 - 12:45         13         1         4         06:30 - 06:45         60         52         112         12:30 - 12:45         116         115         06:30 - 66:45         70         0         50         0         70           12:45 - 01:00         4         3         7         06:45 - 07:00         54         60         114         12:30 - 12:45         116         015         015         015         015         015         015         015         015         015         015         015         015         015         015         015         015         015         015         016         070         074         06         06         06         070         074	12:00 - 12:15	6	9	15	06:00 - 06:15	33	31	64	12:00 - 12:15	91	104	195	06:00 - 06:15	64	1	65
12:23 - 12:45       3       1       4       06:30 - 06:45       60       52       112       12:23 - 12:45       116       113       22:9       06:30 - 06:45       70       0       0       70       0       70       0       70	12:15 - 12:30	2	1	3	06:15 - 06:30	57	64	121	12:15 - 12:30	88	105	193	06:15 - 06:30	81	0	81
12.45 - 01.00         4         3         7         06645 - 07.00         54         60         114         12.45 - 01.00         89         96         185         06.45 - 07.00         50         00         50           01.00 - 01.15         6         6         12         0700 - 07.15         66         85         151         01100 - 01.15         101         916         07.00 - 07.15         67         0         64         64         0         64         64         0         64         64         0         64         64         0         64         64         64         64         64         64         64         64         64         64         64         64         64         64         64         64         64         6	12:30 - 12:45	3	1	4	06:30 - 06:45	60	52	112	12:30 - 12:45	116	113	229	06:30 - 06:45	70	0	70
0100 - 01:15         6         6         12         07:00 - 07:15         66         85         151         01:00 - 01:15         101         95         196         07:00 - 07:15         51         00         51         00         51         00         51         01          01:15 - 01:30         4         4         8         07:15 - 07:30         72         105         177         01:15 - 01:30         70         114         81         07:30 - 07:45         67         0         67           01:45 - 02:00         7         4         11         07:45 - 08:00         84         132         216         01:45 - 02:00         100         115         215         07:45 - 08:00         57         02:00         02:01         11         08:01 - 08:15         71         125         200         02:01 - 02:30         98         118         216         08:05 - 08:0         68         0         66         0         66         0         66         0         66         0         67         0         02:15 - 02:30         98         118         218         08:35 - 08:0         68         0         66         0         61         03:00 - 03:15         92         150         133         218	12:45 - 01:00	4	3	7	06:45 - 07:00	54	60	114	12:45 - 01:00	89	96	185	06:45 - 07:00	50	0	50
01:15 · 01:30         4         4         8         07:15 · 07:30         72         105         177         01:15 · 01:30         70         115         185         07:15 · 07:30         64         00         644           01:30 · 01:45         3         7         10         07:30 · 07:45         87         105         122         01:30 · 01:45         070         104         211         07:30 · 07:45         67         0         67           01:45 · 02:00         4         6         10         08:00 · 08:15         75         125         200         02:00 · 02:15         103         116         219         08:00 · 08:15         54         0         54           02:15 · 02:30         1         100         11         08:15 · 08:30         68         87         81         166         02:30 · 02:45         105         113         218         08:30 · 08:45         50         65         50         50         248         08:45 · 09:00         43         1         44           03:00 · 03:15         10         2         12         09:00 · 09:15         81         80         161         03:00 · 03:15         131         250         09:10 · 09:15         38         1         33 <td>01:00 - 01:15</td> <td>6</td> <td>6</td> <td>12</td> <td>07:00 - 07:15</td> <td>66</td> <td>85</td> <td>151</td> <td>01:00 - 01:15</td> <td>101</td> <td>95</td> <td>196</td> <td>07:00 - 07:15</td> <td>51</td> <td>0</td> <td>51</td>	01:00 - 01:15	6	6	12	07:00 - 07:15	66	85	151	01:00 - 01:15	101	95	196	07:00 - 07:15	51	0	51
0130 - 0145 $3$ $7$ $10$ $07,30 - 07,45$ $87$ $105$ $192$ $0130 - 0145$ $107$ $104$ $211$ $07,30 - 07,45$ $67$ $00$ $67$ $0145 - 02.00$ $7$ $4$ $11$ $07,45 - 08.00$ $84$ $132$ $216$ $01,45 - 02.00$ $100$ $115$ $215$ $07,45 - 08.05$ $57$ $00$ $57$ $00$ $57$ $0200 - 02:15$ $11$ $100$ $110$ $0800 - 08:15$ $75$ $86$ $81$ $146$ $02:15 - 02:30$ $98$ $118$ $216$ $08:51 - 08:30$ $68$ $00$ $68$ $02:30 - 02:45$ $44$ $3$ $7$ $08:30 - 08:45$ $87$ $81$ $168$ $02:15 - 02:30$ $98$ $118$ $216$ $08:15 - 08:30$ $68$ $00$ $55$ $02:30 - 02:45$ $44$ $3$ $7$ $08:30 - 08:45$ $87$ $81$ $166$ $02:30 - 02:45$ $105$ $113$ $218$ $08:30 - 08:45$ $55$ $00$ $55$ $02:30 - 02:45$ $44$ $3$ $7$ $12$ $090 - 09:15$ $81$ $80$ $161$ $03:00 - 03:15$ $113$ $218$ $08:65 - 09:30$ $48$ $13$ $39$ $03:30 - 03:45$ $7$ $7$ $144$ $09:00 - 09:15$ $81$ $80$ $161$ $03:30 - 03:45$ $117$ $130$ $237$ $09:30 - 04:54$ $51$ $00$ $45$ $03:30 - 03:45$ $7$ $7$ $144$ $09:40 - 00:45$ $76$ $03:45 - 04:00$ $119$ $131$ $25$	01:15 - 01:30	4	4	8	07:15 - 07:30	72	105	177	01:15 - 01:30	70	115	185	07:15 - 07:30	64	0	64
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	01:30 - 01:45	3	7	10	07:30 - 07:45	87	105	192	01:30 - 01:45	107	104	211	07:30 - 07:45	67	0	67
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	01:45 - 02:00	7	4	11	07:45 - 08:00	84	132	216	01:45 - 02:00	100	115	215	07:45 - 08:00	57	0	57
$02:15 \cdot 02:30$ 11011 $08:15 \cdot 08:30$ 6581146 $02:15 \cdot 02:30$ 98118216 $08:15 \cdot 08:30$ 66800668 $02:30 \cdot 02:45$ 437 $08:30 \cdot 08:45$ 8781168 $02:30 \cdot 02:45$ 105113218 $08:30 \cdot 08:45$ 550055 $02:45 \cdot 03:00$ 711212 $08:65 \cdot 09:00$ 7783160 $02:30 \cdot 02:45$ 96152248 $08:45 \cdot 09:00$ 43144 $03:00 \cdot 03:15$ 9918 $09:15 \cdot 09:30$ 75889164 $03:00 \cdot 03:15$ 92150248 $09:00 \cdot 09:15$ 38139 $03:15 \cdot 03:30$ 99918 $09:15 \cdot 09:30$ 6595160 $03:30 \cdot 03:45$ 107130237 $09:30 \cdot 09:45$ 510051 $03:45 \cdot 04:00$ 8614 $09:45 \cdot 10:00$ 6778145 $03:45 \cdot 04:00$ 119108227 $09:30 \cdot 09:45$ 510045 $04:00 \cdot 04:15$ 69178 $04:00 \cdot 04:15$ 11755172 $10:00 \cdot 10:15$ 28129 $04:15 \cdot 04:30$ 9409409409410:00 \cdot 10:1528121 $04:15 \cdot 04:30$ 1124 $10:00 \cdot 10:15$ 86114193 $04:45 \cdot 05:00$ 110011010:00 \cdot 10:1528121 $04:15 \cdot 04:30$ <td>02:00 - 02:15</td> <td>4</td> <td>6</td> <td>10</td> <td>08:00 - 08:15</td> <td>75</td> <td>125</td> <td>200</td> <td>02:00 - 02:15</td> <td>103</td> <td>116</td> <td>219</td> <td>08:00 - 08:15</td> <td>54</td> <td>0</td> <td>54</td>	02:00 - 02:15	4	6	10	08:00 - 08:15	75	125	200	02:00 - 02:15	103	116	219	08:00 - 08:15	54	0	54
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	02:15 - 02:30	1	10	11	08:15 - 08:30	65	81	146	02:15 - 02:30	98	118	216	08:15 - 08:30	68	0	68
02:45 - 03:00 $7$ $12$ $19$ $08:45 - 09:00$ $17$ $83$ $160$ $02:45 - 03:00$ $96$ $152$ $248$ $08:45 - 09:00$ $43$ $1$ $44$ $03:0 - 03:15$ $10$ $2$ $12$ $09:0 - 09:15$ $81$ $80$ $161$ $03:0 - 03:15$ $92$ $150$ $242$ $09:0 - 09:15$ $38$ $1$ $39$ $03:15 - 03:30$ $9$ $9$ $9$ $18$ $09:15 - 09:30$ $75$ $89$ $164$ $03:15 - 03:30$ $119$ $131$ $250$ $09:15 - 09:30$ $48$ $0$ $48$ $0$ $48$ $03:30 - 03:45$ $07$ $7$ $89$ $166$ $03:30 - 03:45$ $107$ $130$ $237$ $09:30 - 09:45$ $51$ $0$ $51$ $04:45 - 04:00$ $7$ $7$ $89$ $166$ $03:35 - 04:00$ $119$ $108$ $227$ $09:30 - 09:45$ $50$ $0$ $45$ $04:00 - 04:15$ $6$ $9$ $10:0 - 10:15$ $82$ $96$ $178$ $04:00 - 04:15$ $119$ $108$ $227$ $09:30 - 09:45$ $00$ $45$ $00$ $45$ $04:00 - 04:15$ $6$ $9$ $10:00 - 10:15$ $82$ $96$ $178$ $04:00 - 04:15$ $119$ $108$ $272$ $09:30 - 09:45$ $10:15 - 0:30$ $45$ $00$ $10:15 - 0:30$ $45$ $00$ $10:00 - 10:15$ $10:15 - 0:30$ $10:15 - 0:30$ $119$ $100$ $100$ $10:15 - 0:30$ $10:15 - 0:30$ $10:15 - 0:30$ $10:15 - 0:30$ $10:15 - 0:30$	02:30 - 02:45	4	3	7	08:30 - 08:45	87	81	168	02:30 - 02:45	105	113	218	08:30 - 08:45	55	0	55
03:00 - 03:15 $10$ $2$ $12$ $09:00 - 09:15$ $81$ $80$ $161$ $03:00 - 03:15$ $92$ $150$ $242$ $09:00 - 09:15$ $38$ $1$ $39$ $03:15 - 03:30$ $9$ $9$ $18$ $09:15 - 09:30$ $75$ $89$ $164$ $03:15 - 03:30$ $119$ $131$ $250$ $09:15 - 09:30$ $48$ $00$ $48$ $03:30 - 03:45$ $7$ $7$ $144$ $09:30 - 09:45$ $655$ $955$ $160$ $03:30 - 03:45$ $107$ $130$ $237$ $09:45 - 00:00$ $455$ $00$ $455$ $04:00 - 04:15$ $6$ $9$ $15$ $10:00 - 10:15$ $82$ $96$ $178$ $03:45 - 04:00$ $119$ $108$ $227$ $09:45 - 10:00$ $455$ $0.0$ $455$ $04:00 - 04:15$ $6$ $9$ $15$ $10:00 - 10:15$ $82$ $96$ $178$ $04:00 - 04:15$ $117$ $555$ $172$ $10:00 - 10:15$ $28$ $11$ $29$ $04:15 - 04:30$ $9$ $7$ $16$ $10:00 - 10:15$ $82$ $96$ $178$ $04:00 - 04:15$ $117$ $555$ $172$ $10:00 - 10:15$ $28$ $11$ $29$ $04:30 - 04:45$ $13$ $11$ $24$ $10:30 - 10:45$ $82$ $87$ $169$ $04:30 - 04:45$ $91$ $0$ $91$ $10:30 - 10:45$ $10$ $75$ $116$ $10:45 - 11:00$ $28$ $00$ $28$ $00$ $28$ $00$ $28$ $00$ $28$ $00$ $28$ $00$ $28$ <t< td=""><td>02:45 - 03:00</td><td>7</td><td>12</td><td>19</td><td>08:45 - 09:00</td><td>77</td><td>83</td><td>160</td><td>02:45 - 03:00</td><td>96</td><td>152</td><td>248</td><td>08:45 - 09:00</td><td>43</td><td>1</td><td>44</td></t<>	02:45 - 03:00	7	12	19	08:45 - 09:00	77	83	160	02:45 - 03:00	96	152	248	08:45 - 09:00	43	1	44
03:15 - 03:309918 $09:15 - 09:30$ 7589164 $03:15 - 03:30$ 119131250 $09:15 - 09:30$ 48048 $03:30 - 03:45$ 7714 $09:30 - 09:45$ 6595160 $03:30 - 03:45$ 107130237 $09:30 - 09:45$ 51051 $03:45 - 04:00$ 8614 $09:45 - 10:00$ 6778145 $03:35 - 03:30$ 119110237 $09:30 - 09:45$ 51045045 $04:00 - 04:15$ 691510:00 - 10:158296178 $04:00 - 04:15$ 11755172 $10:00 - 10:15$ 28129 $04:15 - 04:30$ 971610:15 - 10:3080110190 $04:15 - 04:30$ 9409410:15 - 10:3045045 $04:30 - 04:45$ 13112410:30 - 10:458287169 $04:30 - 04:45$ 9109410:15 - 10:3045045 $04:45 - 05:00$ 12112310:45 - 11:0079114193 $04:45 - 05:00$ 110011010:45 - 11:0028028 $05:15 - 05:30$ 1592411:15 - 11:307789166 $05:15 - 05:30$ 118011811:00 - 11:1518321 $05:45 - 06:00$ 26275311:45 - 12:0086123209 $05:45 - 06:00$	03:00 - 03:15	10	2	12	09:00 - 09:15	81	80	161	03:00 - 03:15	92	150	242	09:00 - 09:15	38	1	39
03:30 - 03:45 $7$ $7$ $14$ $09:30 - 09:45$ $65$ $95$ $160$ $03:30 - 03:45$ $107$ $130$ $237$ $09:30 - 09:45$ $51$ $0$ $51$ $03:45 - 04:00$ $8$ $6$ $14$ $09:45 - 10:00$ $67$ $78$ $145$ $03:35 - 04:00$ $119$ $108$ $227$ $09:30 - 09:45$ $51$ $0$ $45$ $0$ $45$ $04:00 - 04:15$ $6$ $9$ $15$ $10:00 - 10:15$ $82$ $96$ $178$ $04:00 - 04:15$ $117$ $55$ $172$ $10:00 - 10:15$ $28$ $1$ $29$ $04:15 - 04:30$ $9$ $7$ $16$ $10:15 - 10:30$ $80$ $110$ $190$ $04:15 - 04:30$ $94$ $0$ $94$ $10:15 - 10:30$ $45$ $0$ $45$ $04:30 - 04:45$ $13$ $11$ $24$ $10:30 - 10:45$ $82$ $87$ $169$ $04:30 - 04:45$ $91$ $0$ $94$ $0$ $94$ $10:15 - 10:30$ $45$ $0$ $45$ $04:30 - 04:45$ $13$ $11$ $24$ $10:30 - 10:45$ $82$ $87$ $169$ $04:30 - 04:45$ $91$ $0$ $94$ $0$ $94$ $0$ $10:15 - 10:30$ $45$ $0$ $45$ $04:45 - 05:00$ $12$ $11$ $23$ $10:45 - 11:00$ $79$ $114$ $193$ $04:45 - 05:00$ $110$ $0$ $110$ $10:45 - 11:00$ $28$ $0$ $28$ $0$ $28$ $0$ $28$ $0$ $28$ $0$ $28$ $0$ $28$ <td< td=""><td>03:15 - 03:30</td><td>9</td><td>9</td><td>18</td><td>09:15 - 09:30</td><td>75</td><td>89</td><td>164</td><td>03:15 - 03:30</td><td>119</td><td>131</td><td>250</td><td>09:15 - 09:30</td><td>48</td><td>0</td><td>48</td></td<>	03:15 - 03:30	9	9	18	09:15 - 09:30	75	89	164	03:15 - 03:30	119	131	250	09:15 - 09:30	48	0	48
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	03:30 - 03:45	7	7	14	09:30 - 09:45	65	95	160	03:30 - 03:45	107	130	237	09:30 - 09:45	51	0	51
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	03:45 - 04:00	8	6	14	09:45 - 10:00	67	78	145	03:45 - 04:00	119	108	227	09:45 - 10:00	45	0	45
04:15 - 04:30         9         7         16         10:15 - 10:30         80         110         190         04:15 - 04:30         94         0         94         10:15 - 10:30         45         0         45           04:30 - 04:45         13         11         24         10:30 - 10:45         82         87         169         04:30 - 04:45         91         0         91         10:30 - 10:45         50         1         51           04:45 - 05:00         12         11         23         10:45 - 11:00         79         114         193         04:45 - 05:00         110         0         110         10:45 - 11:00         28         0         28         21           05:00 - 05:15         11         7         18         11:00 - 11:15         86         99         185         05:00 - 05:15         118         0         118         11:00 - 11:15         18         3         21           05:15 - 05:30         15         9         24         11:50 - 11:30         77         89         166         05:15 - 05:30         81         0         81         11:00 - 11:15         18         3         21         77         19           05:30 - 05:45         25	04:00 - 04:15	6	9	15	10:00 - 10:15	82	96	178	04:00 - 04:15	117	55	172	10:00 - 10:15	28	1	29
04:30 - 04:45         13         11         24         10:30 - 10:45         82         87         169         04:30 - 04:45         91         0         91         10:30 - 10:45         50         1         51           04:45 - 05:00         12         11         23         10:45 - 11:00         79         114         193         04:45 - 05:00         110         0         110         10:45 - 11:00         28         0         28           05:00 - 05:15         11         7         18         11:00 - 11:15         86         99         185         05:00 - 05:15         118         0         118         11:00 - 11:15         18         3         21           05:15 - 05:30         15         9         24         11:50 - 11:30         77         89         166         05:15 - 05:30         81         0         81         11:00 - 11:15         18         3         21           05:30 - 05:45         25         21         46         11:30 - 11:45         93         92         185         05:30 - 05:45         76         0         76         11:30 - 11:45         16         8         24           05:45 - 06:00         26         27         53         11:45 - 12:00<	04:15 - 04:30	9	7	16	10:15 - 10:30	80	110	190	04:15 - 04:30	94	0	94	10:15 - 10:30	45	0	45
0445 - 05:00         12         11         23         10:45 - 11:00         79         114         193         04:45 - 05:00         110         0         110         10:45 - 11:00         28         0         28           05:00 - 05:15         11         7         18         11:00 - 11:15         86         99         185         05:00 - 05:15         118         0         118         11:00 - 11:15         18         3         21           05:15 - 05:30         15         9         24         11:15 - 11:30         77         89         166         05:15 - 05:30         81         0         81         11:00 - 11:15         18         3         21           05:30 - 05:45         25         21         46         11:30 - 11:45         93         92         185         05:30 - 05:45         76         0         76         11:30 - 11:45         16         8         24           05:45 - 06:00         26         27         53         11:45 - 12:00         86         123         209         05:45 - 06:00         80         0         80         11:45 - 12:00         9         3         12	04:30 - 04:45	13	11	24	10:30 - 10:45	82	87	169	04:30 - 04:45	91	0	91	10:30 - 10:45	50	1	51
05:00 - 05:15         11         7         18         11:00 - 11:15         86         99         185         05:00 - 05:15         118         0         118         11:00 - 11:15         18         21           05:15 - 05:30         15         9         24         11:15 - 11:30         77         89         166         05:15 - 05:30         81         0         81         11:00 - 11:15         18         21           05:30 - 05:45         25         21         46         11:30 - 11:45         93         92         185         05:30 - 05:45         76         0         76         11:30 - 11:45         16         8         24           05:45 - 06:00         26         27         53         11:45 - 12:00         86         123         209         05:45 - 06:00         80         0         80         11:45 - 12:00         9         3         12	04:45 - 05:00	12	11	23	10:45 - 11:00	79	114	193	04:45 - 05:00	110	0	110	10:45 - 11:00	28	0	28
05:15 - 05:30         15         9         24         11:15 - 11:30         77         89         166         05:15 - 05:30         81         0         81         11:15 - 11:30         7         19           05:30 - 05:45         25         21         46         11:30 - 11:45         93         92         185         05:30 - 05:45         76         0         76         11:30 - 11:45         16         8         24           05:45 - 06:00         26         27         53         11:45 - 12:00         86         123         209         05:45 - 06:00         80         0         80         11:45 - 12:00         9         3         12	05:00 - 05:15	11	7	18	11:00 - 11:15	86	99	185	05:00 - 05:15	118	0	118	11:00 - 11:15	18	3	21
05:30 - 05:45         25         21         46         11:30 - 11:45         93         92         185         05:30 - 05:45         76         0         76         11:30 - 11:45         16         8         24           05:34 - 06:00         26         27         53         11:45 - 12:00         86         123         209         05:45 - 06:00         80         0         80         11:45 - 12:00         9         3         12	05:15 - 05:30	15	9	24	11:15 - 11:30	77	89	166	05:15 - 05:30	81	0	81	11:15 - 11:30	12	7	19
05:45 - 06:00 26 27 53 11:45 - 12:00 86 123 209 05:45 - 06:00 80 0 80 11:45 - 12:00 9 3 12	05:30 - 05:45	25	21	46	11:30 - 11:45	93	92	185	05:30 - 05:45	76	0	76	11:30 - 11:45	16	8	24
	05:45 - 06:00	26	27	53	11:45 - 12:00	86	123	209	05:45 - 06:00	80	0	80	11:45 - 12:00	9	3	12

release 48 Set Screen Reader Mode On

Run Date: 24-MAR	-22				State of	Hawaii, Dej	partment of 15 Minute	Transportation, High Volume Report	nways Divis	ion					
Site ID: B71277000 Functional Class: U Location:	332 JRBAN:COLLEC	TOR				Town: Ha Count Typ DATE: 10-	waii 9e: CLASS - <b>DEC-20</b>	DIR 1 Coun	: +MP ter Type: Tub	e	DIR	<b>2:</b> -MP	Final AADT: 7 Route No: 27	7800 70	
AM COMMUTER PI	ERIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIO	D (15:00-19:0	0)	DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							TWO DIRECTIONAL PE	AK						
AM - PEAK HR T	IME		08:4	15 to 09:45 AM		100		PM - PEAK HR TIME			03:45 to	04:45 PM		740	
AM - PEAK HR V	OLUME		246	246		492		PM - PEAK HR VOLU	ME		337	375		712	
AM - D(%)	,76)		50	50		100		PIVI - K FACTOR(%)			47.33	52.67		100	
DIRECTIONAL PEA	٩ĸ		50	50		100		DIRECTIONAL PEAK			47.55	52.07		100	
AM - PEAK HR T	IME		08:45 to 09:4	5 AM 08:45 to	09:45 AM			PM - PEAK HR TIME			03:00 to 04:00 PN	04:00 to 05:0	00 PM		
AM - PEAK HR V	OLUME		246	246				PM - PEAK HR VOLU	ME		341	394			
AM PERIOD (00:00	-12:00)		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0	10)		DIR 1	DIR 2		TOTAL	
			10.4	15 to 11:45 AM					AK		02:45 to				
AN - PEAK HR V			312	15 LU 11.45 AIVI 364		676			ME		337	375		712	
AM - K FACTOR	(OLOIVIE (%)		512	504		825		PM - K FACTOR(%)	VIE		551	515		869	
AM - D(%)	,,,,,		50	50		100		PM -D(%)			47.33	52.67		100	
		<b>1-15</b> •00)	DIR 1	DIR 2		τοται		6-HR 12-HR 24-HR PF	RIODS		DIR 1	DIR 2		τοται	
TWO DIRECTION	AL PEAK	5 15.00)	Dire	Dirice		TOTAL		AM 6-HR PERIOD (06:0	0-12:00)		1.396	1.490		2.886	
PEAK HR TIME	12 · 12 · 11		02:1	15 to 03:15 PM				AM 12-HR PERIOD (00	:00-12:00)		1,548	1,598		3,146	
PEAK HR VOLUN	ΛE		302	398		700		PM 6-HR PERIOD (12:0	00-18:00)		1,789	2,149		3,938	
DIRECTIONAL PEA	٩K							PM 12-HR PERIOD (12	:00-24:00)		2,315	2,729		5,044	
PEAK HR TIME			10:30 to 11:3	0 AM 02:15 to	03:15 PM			24-HR PERIOD (12:00-	24:00)		3,863	4,327		8,190	
PEAK HR VOLUN	ИЕ		342	398				D%			47.17	52.83		100	
TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	9	14	06:00 - 06:15	22	16	38	12:00 - 12:15	73	98	171	06:00 - 06:15	68	68	136
12:15 - 12:30	1	10	11	06:15 - 06:30	28	52	80	12:15 - 12:30	63	96	159	06:15 - 06:30	60	65	125
12:30 - 12:45	4	4	8	06:30 - 06:45	31	40	71	12:30 - 12:45	72	78	150	06:30 - 06:45	45	45	90
12:45 - 01:00	1	4	5	06:45 - 07:00	38	35	73	12:45 - 01:00	78	72	150	06:45 - 07:00	36	38	74
01:00 - 01:15	0	2	2	07:00 - 07:15	39	35	74	01:00 - 01:15	75	73	148	07:00 - 07:15	33	45	78
01:15 - 01:30	3	2	5	07:15 - 07:30	54	52	106	01:15 - 01:30	93	87	180	07:15 - 07:30	25	28	53
01:30 - 01:45	1	3	4	07:30 - 07:45	57	58	115	01:30 - 01:45	75	85	160	07:30 - 07:45	23	32	55
01:45 - 02:00	2	4	6	07:45 - 08:00	50	56	106	01:45 - 02:00	75	96	171	07:45 - 08:00	22	26	48
02:00 - 02:15	1	3	4	08:00 - 08:15	65	68	133	02:00 - 02:15	72	78	150	08:00 - 08:15	20	15	35
02:15 - 02:30	6	1	7	08:15 - 08:30	52	56	108	02:15 - 02:30	72	96	168	08:15 - 08:30	14	29	43
02:30 - 02:45	5	1	6	08:30 - 08:45	52	45	97	02:30 - 02:45	63	100	163	08:30 - 08:45	29	17	46
02:45 - 03:00	4	7	11	08:45 - 09:00	57	66	123	02:45 - 03:00	72	94	166	08:45 - 09:00	21	26	47
03:00 - 03:15	6	1	7	09:00 - 09:15	64	62	126	03:00 - 03:15	95	108	203	09:00 - 09:15	13	15	28
03:15 - 03:30	7	1	8	09:15 - 09:30	66	59	125	03:15 - 03:30	78	81	159	09:15 - 09:30	18	22	40
03:30 - 03:45	6	3	9	09:30 - 09:45	59	59	118	03:30 - 03:45	73	95	168	09:30 - 09:45	21	19	40
03:45 - 04:00	3	3	6	09:45 - 10:00	49	63	112	03:45 - 04:00	95	77	172	09:45 - 10:00	10	16	26
04:00 - 04:15	6	3	9	10:00 - 10:15	61	90	151	04:00 - 04:15	76	94	170	10:00 - 10:15	8	7	15
04:15 - 04:30	4	2	6	10:15 - 10:30	62	72	134	04:15 - 04:30	72	84	156	10:15 - 10:30	13	11	24
04:30 - 04:45	7	2	9	10:30 - 10:45	97	70	167	04:30 - 04:45	94	120	214	10:30 - 10:45	8	14	22
04:45 - 05:00	11	6	17	10:45 - 11:00	89	87	176	04:45 - 05:00	57	96	153	10:45 - 11:00	10	8	18
05:00 - 05:15	6	5	11	11:00 - 11:15	79	92	171	05:00 - 05:15	78	82	160	11:00 - 11:15	9	8	17
05:15 - 05:30	17	- 7	24	11:15 - 11:30	77	84	161	05:15 - 05:30	62		148	11:15 - 11:30	12	11	23
05:30 - 05:45	21	12	33	11:30 - 11:45	67	101	168	05:30 - 05:45	75	79	154	11:30 - 11:45		6	13
05:45 - 06:00	25	13	38	11:45 - 12:00	81	72	153	05:45 - 06:00	51	94	145	11:45 - 12:00	1	9	10
00.00	25	1.5	50	11.45 - 12.00	01	14	133	00.00	51	54	145	11.45 - 12.00	1	9	10

release 48 Set Screen Reader Mode On

RS

Run Date: 24-MAR	8-22				State of	Hawaii, Dep	oartment of 15 Minute	Transportation, High Volume Report	ways Divis	ion					
Site ID: B71277000 Functional Class: U Location:	)332 JRBAN:COLLEC	TOR				Town: Hav Count Typ DATE: 11-	waii e: CLASS DEC-20	DIR 1 Coun	: +MP <b>ter Type:</b> Tub	e	DIR	<b>2:</b> -MP	Final AADT: 7 Route No: 27	7800 70	
AM COMMUTER P	ERIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIO	D (15:00-19:0	0)	DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							TWO DIRECTIONAL PE	AK						
AM - PEAK HR T			08:	:30 to 09:30 AM				PM - PEAK HR TIME	45		03:45 to	04:45 PM		701	
AM - PEAK HR V	OLUME		276	277		553		PM - PEAK HR VOLUN	ME		405	386		791 9.47	
AM - D(%)	(70)		49 91	50.09		5.92 100		PM -D(%)			51.2	48.8		0.47 100	
DIRECTIONAL PE	AK		45.51	50.05		100		DIRECTIONAL PEAK			51.2	40.0		100	
AM - PEAK HR T	IME		08:45 to 09:	45 AM 08:30 to 0	09:30 AM			PM - PEAK HR TIME			03:15 to 04:15 PN	A 04:00 to 05:0	0 PM		
AM - PEAK HR V	/OLUME		287	277				PM - PEAK HR VOLUM	ME		411	406			
AM PERIOD (00:00	)-12:00)		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0	10)		DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK			45 · 10 45 DM				TWO DIRECTIONAL PE	AK		12.00.	01 00 PM			
AM - PEAK HR I			359	:45 to 12:45 PM		806		PM - PEAK HR TIME			12:00 to	01:00 PM		946	
ANI - PEAK HR V	(%)		358	448		800		PIVI - PEAK HR VOLUP	VIE		385	401		9.06	
AM - D(%)	(70)		49.91	50.09		100		PM -D(%)			51.2	48.8		100	
,															
	PERIOD (09:00	0-15:00)	DIR 1	DIR 2		TOTAL		6-HR, 12-HR, 24-HR PE	RIODS		DIR 1	DIR 2		TOTAL	
DEAK HR TIME	AL PEAK		12	:00 to 01:00 PM				AM 12-HR PERIOD (06:0	00-12:00)		1,514	1,610		3,124	
	//F		385	.00 10 01.00 1 Wi 461		846		PM 6-HR PERIOD (12:0	0-18.00)		2 142	2 4 2 8		4 570	
DIRECTIONAL PE	AK		505	401		040		PM 12-HR PERIOD (12)	:00-24:00)		2.749	3,156		5.905	
PEAK HR TIME			12:00 to 01:	00 PM 12:00 to 0	01:00 PM			24-HR PERIOD (12:00-	24:00)		4,433	4,902		9,335	
PEAK HR VOLUN	ЧЕ		385	461				D%			47.49	52.51		100	
TING ANA	DID1		TOTAL	TINE ANA	DID1		TOTAL		DID1	DID 3	TOTAL		DID1	DID 2	TOTAL
12:00 12:15	DIRI	DIK 2	TOTAL	06:00 06:15	DIR1 19	DIK 2	101AL 21	12:00 12:15	DIR1	DIR 2	208	06:00 06:15	DIKI	DIR 2	120
12:15 - 12:30	10	8	18	06:15 - 06:30	20	15	51	12:00 - 12:13	90	110	206	06:15 - 06:30	60	65	130
12:10 12:45	2	E E	0	06:20 06:45	20	27	69	12:10 12:30	97	117	200	06:20 06:45	45	65	125
12:45 - 01:00	5	5	10	06:45 - 07:00	45	41	86	12:45 - 01:00	103	117	214	06:45 - 07:00	20	56	85
01:00 01:15	2	2	10	07:00 07:15	45	41	91	01:00 01:15	74	05	160	07:00 07:15	25	19	03
01:15 - 01:30	7	3	10	07:15 - 07:30	51	40	93	01:15 - 01:30	86	93	103	07:15 - 07:30		40	03
01:20 01:45	2	9	10	07:20 07:45	77	-+ <u>2</u>	121	01:20 01:45	109	112	221	07:20 07:45	24		61
01:45 - 02:00	2	0	6	07:45 - 08:00	78	76	154	01:45 - 02:00	96	100	196	07:45 - 08:00	20	40	69
02:00 - 02:15	4	5	9	08:00 - 08:15	58	10	102	02:00 - 02:15	82	103	190	08:00 - 08:15	25	25	50
02:15 - 02:30		1	6	08:15 - 08:30	14	59	102	02:15 - 02:30	99	94	103	08:15 - 08:30	30	29	59
02:30 - 02:30	-		6	08.30 - 08.45	62	62	121	02.13 - 02.30	82	0.4 Q.A	176	08.30 - 08.45	22	22	55
02:45 - 03:00	2	2	4	08:45 - 09:00	67	62	120	02:30 - 02:45	87	102	189	08:45 - 09:00	24	25	رد ۵۷
03:00 - 03:15	2	3		09:00 - 09:15	67	70	137	03:00 - 03:15	82	130	212	09:00 - 09:15	32	23	
03:15 - 03:30	5	3	8	09:15 - 09:30	79	70	156	03:15 - 03:30	99	89	188	09:15 - 09:30	17	30	47
03:30 - 03:45	8	7	15	09:30 - 09:45	74	56	130	03:30 - 03:45	100	93	193	09:30 - 09:45	19	22	41
03:45 - 04:00	4	3	7	09:45 - 10:00	64	68	130	03:45 - 04:00	100	83	193	09:45 - 10:00	12	20	32
04:00 - 04:15	10	4	14	10:00 - 10:15	73	86	150	04:00 - 04:15	112	101	213	10:00 - 10:15	15	26	3∠ ⊿1
04:15 - 04:20	5	-	11	10:15 - 10:30	70	00 Q2	162	04.00 - 04.15	80	07	196	10:15 - 10:30	0	16	25
04.30 - 04.30	11	7	19	10:30 - 10:45	20	92 Q/	102	04.15 - 04.50	10/	105	200	10:30 - 10:30	10	۵ ۵	23
04.45	10	1	10	10:45	7/	04	172	04.45 05.00	60	105	172	10:30 - 10:45	12	5	21
05.00 - 05.15	11	4	17	11.00 - 11.15	75	50	167	05.00 - 05.15	80	105 Q2	172	11:00 - 11:15	10	14	23
05:15 05:20	16	10	20	11.15 11.20	05	100	107	05.00 - 05.15	76	00	162	11.00 - 11.15	7	0	15
05.13 - 05.50	10	6	10	11:30 11:45	90	100	190	05.10 - 05.50	70	00	102	11:30 11:45	10	10	21
05:45	24	21	15	11:45 12:00	76	105	105	05.30 - 05.45	F2	117	170	11:45	10	12	24
00.00 - 00.00	24	<u> </u>	45	11.43 - 12.00	10	102	170	03.43 - 00.00	55	117	170	11.43 - 12.00	10	15	23

release 48 Set Screen Reader Mode On

RS

Run Date: 24-MAR	8-22				State of	Hawaii, Dej	partment of 15 Minute	f Transportation, High Volume Report	ways Divis	ion					
Site ID: B71277000 Functional Class: U Location:	)332 JRBAN:COLLEC	TOR				Town: Ha Count Typ DATE: 26	waii <b>be:</b> CLASS - <b>APR-21</b>	DIR 1: Count	+MP <b>er Type:</b> Tube		DIR 2:	-MP Fi Ro	nal AADT: 11 Dute No: 2770	000 0	
AM COMMUTER P	ERIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIO	D (15:00-19:0	D)	DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							TWO DIRECTIONAL PE	AK						
AM - PEAK HR T			07:	:45 to 08:45 AM		614		PM - PEAK HR TIME			03:45 to	04:45 PM			
AM - PEAK HR V	OLUME		290	324		614		PM - PEAK HR VOLU	ME		496	548		1,044	
AM - D(%)	(70)		47.23	52 77		100		PM -D(%)			47 51	52.49		100	
DIRECTIONAL PE	AK		47.25	52.11		100		DIRECTIONAL PEAK			47.51	52.45		100	
AM - PEAK HR T	IME		07:45 to 08:4	45 AM 07:30 to 0	08:30 AM			PM - PEAK HR TIME			03:45 to 04:45 PM	03:45 to 04:4	5 PM		
AM - PEAK HR V	/OLUME		290	324				PM - PEAK HR VOLU	ME		496	548			
AM PERIOD (00:00	)-12:00)		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0	10)		DIR 1	DIR 2		TOTAL	
AM - PEAK HR T	AL PEAK TIME		11-	30 to 12:30 PM				PM - PEAK HR TIME	AN		03:45 to	04·45 PM			
AM - PEAK HR V	OLUME		404	436		840		PM - PEAK HR VOLUI	ME		496	548		1.044	
AM - K FACTOR	(%)		101	150		7.95		PM - K FACTOR(%)			150	510		9.88	
AM - D(%)	( )		47.23	52.77		100		PM -D(%)			47.51	52.49		100	
NON COMMUTER	PERIOD (09:00	)-15:00)	DIR 1	DIR 2		TOTAL		6-HR, 12-HR, 24-HR PE	RIODS		DIR 1	DIR 2		TOTAL	
I WO DIRECTION	AL PEAK		02.	-20 +- 02-20 DM				AM 6-HR PERIOD (06:0	00-12:00)		1,710	1,930		3,640	
	AE		421	30 to 03:30 PIVI		057			12:00		1,875	2,090		5,905	
	ΔK		431	520		551		PM 12-HR PERIOD (12.0	·00-24·00)		2,320	2,070		5,198	
PEAK HR TIME	, uc		02:30 to 03:	30 PM 02:30 to (	03:30 PM			24-HR PERIOD (12:00-	24:00)		4,751	5.820		10.571	
PEAK HR VOLUN	ЧЕ		431	526				D%	,		44.94	55.06		100	
12:00 12:15	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	12:00 12:15	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	5	0	10	06:00 - 06:15	34	21	55	12:00 - 12:15	94	100	207	06:00 - 06:15	62 F0	80	148
12.13 - 12.30	5	0	13	06:30 06:45	42	40	02	12:13 - 12:30	90	109	104	06:20 06:45	61	01	140
12.50 - 12.45	4	0	12	06.30 - 06.43	45	45	112	12.30 - 12.43	112	110	244	06.30 - 06.43	44	67	142
12.45 - 01.00	5	4	9	06.45 - 07.00	50	50	112	12.45 - 01.00	115	120	244	06.45 - 07.00	44	72	100
01:00 - 01:15	3	5	10	07:00 - 07:15	40	51	91	01:00 - 01:15	90	129	219	07:00 - 07:15	35	/3	108
01:15 - 01:30	5	5	10	07:15 - 07:30	00	69	135	01:15 - 01:30	75	101	170	07:15 - 07:30	32	49	81
01:30 - 01:45	4	6	10	07:30 - 07:45	58	82	150	01:30 - 01:45	81	92	1/3	07:30 - 07:45	30	47	11
01:45 - 02:00	0	2	2	07:45 - 08:00	78	80	164	01:45 - 02:00	82	122	204	07:45 - 08:00	23	41	64
02:00 - 02:15	1	2	3	08:00 - 08:15	62	80	142	02:00 - 02:15	93	119	212	08:00 - 08:15	21	36	57
02:15 - 02:30	3	3	6	08:15 - 08:30	76	76	152	02:15 - 02:30	/1	112	183	08:15 - 08:30	18	42	60
02:30 - 02:45	2	3	5	08:30 - 08:45	/4	82	156	02:30 - 02:45	122	130	252	08:30 - 08:45	22	29	51
02:45 - 03:00	2	2	4	08:45 - 09:00	61	11	138	02:45 - 03:00	107	132	239	08:45 - 09:00	18	22	40
03:00 - 03:15	4	5	9	09:00 - 09:15	62	63	125	03:00 - 03:15	103	140	243	09:00 - 09:15	16	28	44
03:15 - 03:30	/	/	14	09:15 - 09:30	/1	80	151	03:15 - 03:30	99	124	223	09:15 - 09:30	22	20	42
03:30 - 03:45	6	1	1	09:30 - 09:45	/6	/4	150	03:30 - 03:45	93	123	216	09:30 - 09:45	24	17	41
03:45 - 04:00	2	8	10	09:45 - 10:00	71	91	162	03:45 - 04:00	123	136	259	09:45 - 10:00	14	21	35
04:00 - 04:15	6	1	7	10:00 - 10:15	87	99	186	04:00 - 04:15	133	132	265	10:00 - 10:15	13	22	35
04:15 - 04:30	4	11	15	10:15 - 10:30	83	115	198	04:15 - 04:30	111	138	249	10:15 - 10:30	7	26	33
04:30 - 04:45	8	6	14	10:30 - 10:45	88	93	181	04:30 - 04:45	129	142	271	10:30 - 10:45	8	13	21
04:45 - 05:00	9	6	15	10:45 - 11:00	84	102	186	04:45 - 05:00	101	119	220	10:45 - 11:00	9	10	19
05:00 - 05:15	14	9	23	11:00 - 11:15	95	116	211	05:00 - 05:15	77	133	210	11:00 - 11:15	7	10	17
05:15 - 05:30	18	10	28	11:15 - 11:30	87	114	201	05:15 - 05:30	88	107	195	11:15 - 11:30	3	14	17
05:30 - 05:45	19	14	33	11:30 - 11:45	109	109	218	05:30 - 05:45	83	94	177	11:30 - 11:45	5	10	15
05:45 - 06:00	29	23	52	11:45 - 12:00	103	105	208	05:45 - 06:00	70	90	160	11:45 - 12:00	3	7	10

release 48 Set Screen Reader Mode On

RS

Run Date: 24-MAR	8-22				State of	Hawaii, Dep	partment of 15 Minute	f Transportation, High Volume Report	ways Divisi	on					
Site ID: B71277000 Functional Class: U Location:	)332 JRBAN:COLLEC	TOR				Town: Hay Count Typ DATE: 27-	waii 9e: CLASS - <b>APR-21</b>	DIR 1: Counte	+MP <b>er Type:</b> Tube		DIR 2:	-MP Fi	nal AADT: 11 oute No: 2770	000 )	
AM COMMUTER P	ERIOD (05:00-	09:00)	DIR 1	DIR 2		TOTAL		PM COMMUTER PERIOR	D (15:00-19:00	))	DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							TWO DIRECTIONAL PE	AK			0 / 00 PL /			
AM - PEAK HR I			202	45 to 09:45 AM		740		PM - PEAK HR TIME	45		03:30 to	04:30 PM		1 000	
AM - PEAK HK V	(%)		382	366		748		PM - PEAK HR VOLUN	VIE		1,080	813		1,893	
AM - D(%)	(70)		51.07	48 93		100		PM -D(%)			57.05	42 95		100	
DIRECTIONAL PE	АК		51.07	10.55		100		DIRECTIONAL PEAK			51.05	12.55		100	
AM - PEAK HR T	TIME		08:45 to 09:4	45 AM 07:30 to 0	8:30 AM			PM - PEAK HR TIME			03:30 to 04:30 PM	03:00 to 04:0	0 PM		
AM - PEAK HR V	/OLUME		382	370				PM - PEAK HR VOLUN	ME		1,080	815			
AM PERIOD (00:00	)-12:00)		DIR 1	DIR 2		TOTAL		PM PERIOD (12:00-24:0	0)		DIR 1	DIR 2		TOTAL	
			10-	20 to 11:20 AM					AK		02-20 to	04-20 PM			
ΔM - PEAK HR V			473	259 LO T 1.50 AIVI		932		PIVI - PEAK HR HIVIE PM - PEAK HR VOLLIN	ME		1 080	813		1 893	
AM - K FACTOR	(%)		475	455		6.68		PM - K FACTOR(%)	VIL		1,000	015		13.56	
AM - D(%)	(70)		51.07	48.93		100		PM -D(%)			57.05	42.95		100	
	PERIOD (09:00	0-15:00)	DIR 1	DIR 2		TOTAL		6-HR, 12-HR, 24-HR PEI	RIODS		DIR 1	DIR 2		TOTAL	
TWO DIRECTION	AL PEAK							AM 6-HR PERIOD (06:0	00-12:00)		2,102	2,037		4,139	
PEAK HR TIME			02:	:45 to 03:45 PM				AM 12-HR PERIOD (00	:00-12:00)		2,268	2,217		4,485	
PEAK HR VOLUN	ИE		887	803		1,690		PM 6-HR PERIOD (12:0	00-18:00)		4,138	3,876		8,014	
DIRECTIONAL PE	AK							PM 12-HR PERIOD (12:	:00-24:00)		4,731	4,743		9,474	
PEAK HR TIME			02:45 to 03:4	45 PM 02:00 to 0	03:00 PM			24-HR PERIOD (12:00-2	24:00)		6,999	6,960		13,959	
PEAK HR VOLUN	VE		887	803				D%			50.14	49.86		100	
TIME - AM	DIR1	DIR 2	TOTAL	TIME - AM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL	TIME - PM	DIR1	DIR 2	TOTAL
12:00 - 12:15	1	8	9	06:00 - 06:15	21	22	43	12:00 - 12:15	132	115	247	06:00 - 06:15	54	103	157
12:15 - 12:30	4	6	10	06:15 - 06:30	37	43	80	12:15 - 12:30	129	108	237	06:15 - 06:30	59	78	137
12:30 - 12:45	5	9	14	06:30 - 06:45	51	60	111	12:30 - 12:45	98	114	212	06:30 - 06:45	62	71	133
12:45 - 01:00	3	7	10	06:45 - 07:00	39	48	87	12:45 - 01:00	114	105	219	06:45 - 07:00	41	70	111
01:00 - 01:15	0	1	1	07:00 - 07:15	56	59	115	01:00 - 01:15	177	202	379	07:00 - 07:15	41	83	124
01:15 - 01:30	1	3	4	07:15 - 07:30	74	70	144	01:15 - 01:30	202	180	382	07:15 - 07:30	29	62	91
01:30 - 01:45	5	6	11	07:30 - 07:45	69	94	163	01:30 - 01:45	171	187	358	07:30 - 07:45	28	41	69
01:45 - 02:00	1	7	8	07:45 - 08:00	105	116	221	01:45 - 02:00	223	187	410	07:45 - 08:00	32	34	66
02:00 - 02:15	5	2	7	08:00 - 08:15	85	82	167	02:00 - 02:15	230	211	441	08:00 - 08:15	35	39	74
02:15 - 02:30	0	4	4	08:15 - 08:30	80	78	158	02:15 - 02:30	215	199	414	08:15 - 08:30	30	29	59
02:30 - 02:45	4	6	10	08:30 - 08:45	78	74	152	02:30 - 02:45	191	203	394	08:30 - 08:45	16	34	50
02:45 - 03:00	5	3	8	08:45 - 09:00	80	87	167	02:45 - 03:00	220	190	410	08:45 - 09:00	28	29	57
03:00 - 03:15	0	4	4	09:00 - 09:15	99	86	185	03:00 - 03:15	214	196	410	09:00 - 09:15	19	27	46
03:15 - 03:30	3	6	9	09:15 - 09:30	116	90	206	03:15 - 03:30	211	212	423	09:15 - 09:30	15	33	48
03:30 - 03:45	4	4	8	09:30 - 09:45	87	103	190	03:30 - 03:45	242	205	447	09:30 - 09:45	20	22	42
03:45 - 04:00	1	8	9	09:45 - 10:00	111	88	199	03:45 - 04:00	271	202	473	09:45 - 10:00	10	18	28
04:00 - 04:15	5	5	10	10:00 - 10:15	105	86	191	04:00 - 04:15	267	193	460	10:00 - 10:15	18	16	34
04:15 - 04:30	3	8	11	10:15 - 10:30	114	82	196	04:15 - 04:30	300	213	513	10:15 - 10:30	15	16	31
04:30 - 04:45	10	16	26	10:30 - 10:45	115	115	230	04:30 - 04:45	101	132	233	10:30 - 10:45	7	22	29
04:45 - 05:00	12	6	18	10:45 - 11:00	116	122	238	04:45 - 05:00	100	129	229	10:45 - 11:00	5	12	17
05:00 - 05:15	13	8	21	11:00 - 11:15	123	118	241	05:00 - 05:15	93	91	184	11:00 - 11:15	11	11	22
05:15 - 05:30	28	11	39	11:15 - 11:30	119	104	223	05:15 - 05:30	79	98	177	11:15 - 11:30	8	7	15
05:30 - 05:45	23	19	42	11:30 - 11:45	112	103	215	05:30 - 05:45	76	107	183	11:30 - 11:45	5	4	9
05:45 - 06:00	30	23	53	11:45 - 12:00	110	107	217	05:45 - 06:00	82	97	179	11:45 - 12:00	5	6	11

release 48 Set Screen Reader Mode On

LOCATION: Manono St -- Hawaii Route 19/Mamalahoa Hwy QC JOB #: 15767801 CITY/STATE: Hilo, HI DATE: Wed, Apr 6 2022 Peak-Hour: 7:30 AM -- 8:30 AM 1.5 3.1 204 0.93 161 ŧ Peak 15-Min: 7:30 AM -- 7:45 AM + ŧ **♦** 0 1.4 108 70 26 1.9 . . 1008 🔶 88 🍠 3.1 🔶 3.4 🌶 € 12 ← 789 0 **4** 3 4 **0.89** 470 → ← 720 0.92 4.7 🜩 **+** 2.9 0.93 848 → 290 ٦ 4.4 🜩 4.1 🥆 € 5.3 → 4.4 1 ŧ h ŧ ۴ 180 61 68 4.4 3.3 4.4 ŧ ŧ ÷ **↑** 4.2 0.9 Quality Counts 416 3.8 309 DATA THAT DRIVES COMMUNITIES 0 0 0 . \$ E ┥ 0 🖌 **t** 0 A 0 0 **+** 1 0 7 **f** 0 r ŧ 0 0 0 N/A N/A ÷ t 1 1 ← N/A N/A N/A N/A a ₽ 1 1 ç ٦ ٦ ŧ h ŧ c N/A N/A Hawaii Route 19/Mamalahoa Hawaii Route 19/Mamalahoa Manono St Manono St 15-Min Count Period Hwy (Eastbound) Hwy (Westbound) Total Hourly (Northbound) (Southbound)

Reginning Af										Laste	Jounaj			(WC30	Jounaj			Totals
Degining	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM	21	11	7	0	2	4	12	0	7	57	47	0	3	105	3	0	279	
6:45 AM	21	12	14	0	2	6	15	0	13	80	47	0	5	115	2	0	332	
7:00 AM	47	12	8	0	6	17	18	0	20	103	63	0	10	144	1	0	449	
7:15 AM	46	15	10	0	2	16	12	0	21	116	74	0	12	157	2	0	483	1543
7:30 AM	55	14	17	0	5	21	23	0	15	133	79	0	11	198	4	1	576	1840
7:45 AM	40	18	14	0	4	10	34	0	26	124	88	0	14	185	4	0	561	2069
8:00 AM	37	15	17	0	8	19	28	0	23	110	65	0	20	170	2	0	514	2134
8:15 AM	48	14	20	0	9	20	23	0	24	103	58	0	11	167	2	0	499	2150
8:30 AM	31	11	18	0	7	26	37	0	22	113	72	0	20	156	4	0	517	2091
8:45 AM	47	12	30	0	5	24	16	0	26	124	88	0	11	119	4	0	506	2036
9:00 AM	39	12	19	0	10	16	27	0	17	105	63	0	12	121	9	0	450	1972
9:15 AM	48	14	11	0	9	21	29	0	19	105	61	0	16	137	4	0	474	1947
Peak 15-Min		North	bound			South	bound			Eastb	ound			West	ound		Te	hal
Flowrates	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	10	tai
All Vehicles	220	56	68	0	20	84	92	0	60	532	316	0	44	792	16	4	23	04
Heavy Trucks	4	0	8		0	0	0		4	48	12		0	12	0		8	8
Buses																		
Pedestrians		0				4				0				0			4	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		C	)
Scooters																		
Comments:																		

Report generated on 4/14/2022 4:25 PM

LOCATION: Manono St -- Hawaii Route 19/Mamalahoa Hwy OC JOB #: 15767803 DATE: Wed, Apr 6 2022 CITY/STATE: Hilo, HI Peak-Hour: 3:45 PM -- 4:45 PM 1.3 0.8 ŧ Peak 15-Min: 4:00 PM -- 4:15 PM ÷ ŧ **♦** 0 . . 968 🔶 96 🌶 **€** 9 **←** 678 05 🛥 1 🖈 € 0 € 0.4 0.94 575 🜩 0.94 ← 605 0.92 0.7 🜩 0.5 + **€** 64 **→** 641 0.7 🔹 0.5 🥆 € 0 → 0.8 1060 🔿 389 🤻 ŧ 0.4 1.9 2.2 ŧ + **↑** 0.8 0.87 Quality Counts 0.4 DATA THAT DRIVES COMMUNITIES . .... \$ ł ┥ • • **t** 0 Ate + **f** 0 1 7 ŧ C N/A N/A ÷ و t t ← N/A N/A 🛥 N/A N/A a ₽ ç ŧ r ŧ N/A N/A Hawaii Route 19/Mamalahoa Hawaii Route 19/Mamalahoa Manono St Manono St 15-Min Count Period Beginning At Hwy Hwy Hourly Totals (Northbound) (Southbound) Total (Eastbound) (Westbound) Left Thru Right υ Left Right υ Left U Left υ Thru Thru Right Thru Right 3:00 PM 6 3:15 PM 3:30 PM 3:45 PM 4:00 PM 5 4:15 PM 0 4:30 PM 4:45 PM 

3 5:15 PM 5:30 PM 29 5:45 PN Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru Right U Left Thru Right U Left Thru Right U Left Thru Right υ All Vehicles 0 Heavy Trucks Buses Pedestrians Bicycles Scooters Comments:

Report generated on 4/14/2022 4:26 PM

5:00 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Location: H City/state:	∙awaii Hilo, F	Route II	11/Ma	malah	oa Hw	y Piil	ani St								QC DATE:	: <b>JOB</b> i Wed	#: 1576 , Apr 6	57804 2022
$251 \leftarrow 10$ $0.86  0$ $62 \rightarrow 52$	711 0.92 52 65 7 09 7 09 7 09 7 09 7 09 7 09	2 956 9 0 • • • 2 • • 6 0 1147	0 + 0 0 0 0 + 0	]		Pe Pea	ak-Hou k 15-M Data TH	r: 7:30 in: 7:3	O AM O AM - O AM	8:30 / 7:45	AM AM			84 ← 0 0 48 → 5.8	10 23.1 9 23.4 9 24.5 7. 8.7		• 0 ◆ • 0 •	0
2					-			Ţ		l	<b></b>	-		0 0 1			■ 0 ■ 0 ■ 0	
و ب N/A +	Min Count Hawaii Route 11/Mama				-		:		•]	↑ ↑ [		-		N/A	V		⊾ ► N/A F	
15-Min Count Period Beginning At	Hawai	i Route 1 Hv (Northl	1/Mama vy bound)	alahoa	Hawai	i Route : भ South)	L1/Mama wy bound)	alahoa		Piila (Eastb	ni St ound)			Piila (Westl	ni St bound)		Total	Hourly Totals
Deginning At	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:30 AM 6:45 AM 7:00 AM 7:15 AM 7:30 AM	35 44 59 48 70	171 183 229 210 279	0 0 0 0	0 1 1 0	0 0 0	88 123 135 164 146	2 3 6 2 11	0 0 0 0	2 1 0 2 4	0 0 0 0	8 9 11 11 13	0 0 0 0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	306 364 441 437 523	1548
7:45 AM	56	218	0	0	0	182	11	0	2	0	16	0	0	0	0	0	485	1886
8:00 AM 8:15 AM	37	251 198	0	1 1	0	177 154	17 13	0	3	0	15 8	0	0	0	0	0	499 413	1944 1920
8:30 AM 8:45 AM	31 41	206 177	0 0	0 0	0	173 191	25 29	0 0	2	0 0	44 21	0 0	0	0 0	0 0	0 0	481 461	1878 1854
9:00 AM	28	169	0	0	0	183	19	0	3	0	24	0	0	0	0	0	426	1781
9.15 Alvi	20	North	oound	0	U	South	bound	1	T	Eastb	ound	0	U	West	oound	U	445	1015
Flowrates	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Tot	tal
All Vehicles Heavy Trucks	280 20	1116 44	0 0	0	0 0	584 44	44 16	0	16 0	0 0	52 4	0	0 0	0 0	0 0	0	20: 12	92 !8
Buses Pedestrians Bicycles Scooters	0	0 0	0		0	0 0	0		0	0 0	0		0	0 0	0		C C	)
Comments:																		

Report generated on 4/15/2022 6:54 AM

LOCATION: Hawaii Route 11/Mamalahoa Hwy -- Piilani St QC JOB #: 15767806 CITY/STATE: Hilo, HI DATE: Wed, Apr 6 2022 913 <mark>0.9</mark> Peak-Hour: 3:45 PM -- 4:45 PM 27 3.4 773 ŧ Peak 15-Min: 4:00 PM -- 4:15 PM ŧ ŧ **↑** 0 874 2.9 39 0 0 4 ÷ . 166 🜩 8 🌶 **t** 0 **+** 0 3 + 0 + **a** 0 **t** 0 0.81 0 🔸 0.94 **+** 0 0 0 0 • + 2.6 🔹 2.8 🥆 117 🔶 109 🍾 ŧ h ŧ ۴ 129 765 0 3.9 3.4 0 **♦** 2.8 ÷ ÷ **♦** 3.5 0.92 Quality Counts 985 894 DATA THAT DRIVES COMMUNITIES 0 0 0 0 2 ÷ . ┫ • • **t** 0 A 0 0 0 **+** 0 **f** 0 1 7 1 ŧ r 0 5 0 N/A N/A ÷ ٠ t و t 🛥 N/A ← N/A N/A 📥 N/A Î e Ī ç 7 £ ٦, ŧ r ٩ ŧ c N/A N/A ŧ Hawaii Route 11/Mamalahoa Hawaii Route 11/Mamalahoa Piilani St Piilani St 15-Min Count Period Beginning At Hwy Hwy Hourly Totals (Eastbound) (Westbound) Total (Northbound) (Southbound) Right Right Left Thru υ Left Thru υ Left Thru Right U Left Thru Right υ 3:00 PM 222 196 503 37 17 0 10 0 0 34 0 0 0 0 0 2 2 0 3:15 PM 218 0 1 0 218 9 0 3 0 25 0 0 0 0 491 0 3:30 PM 44 0 2 0 7 0 0 0 0 0 498 212 21 0 0 211 1 3:45 PM 44 199 0 210 0 19 0 0 480 1972 0 0 0 0 0 0 7 1 <mark>28</mark> 29 4:00 PM 0 199 232 186 15 0 0 34 0 0 0 1980 0 0 8 9 0 0 0 0 4:15 PM 181 0 0 30 436 1925 0 0 0 0 26 0 0 3 0 26 0 0 0 497 1924 4:30 PM 186 246 1 192 4:45 PM 42 171 27 435 1879 0 0 0 0 0 0 0 0 0 1 2 0

5:00 PIVI	11	158	0	0	0	1/2	8	0	1	0	27	0	0	0	0	0	3//	1/45
5:15 PM	19	157	0	0	0	166	3	0	0	0	15	0	0	0	0	0	360	1669
5:30 PM	22	170	0	0	0	174	4	0	2	0	14	0	0	0	0	0	386	1558
5:45 PM	21	149	0	0	0	176	6	0	2	0	12	0	0	0	0	0	366	1489
Peak 15-Min		North	bound			South	bound			Eastk	oound			West	bound		Ta	hal
Flowrates	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	10	tai
All Vehicles	112	796	0	4	0	928	60	0	8	0	136	0	0	0	0	0	20	44
Heavy Trucks	4	24	0		0	40	0		0	0	4		0	0	0		7	2
Buses																		
Pedestrians		0				0				0				0			C	)
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		C	)
Scooters																		
Comments:																		

Report generated on 4/15/2022 6:58 AM

LOCATION: Manono St -- Piilani St QC JOB #: 15767807 DATE: Wed, Apr 6 2022 CITY/STATE: Hilo, HI Peak-Hour: 7:30 AM -- 8:30 AM 391 0.87 299 4.3 ŧ Peak 15-Min: 7:30 AM -- 7:45 AM ŧ ŧ ŧ 3.8 6.1 ÷ L. J. . 51 + 17 + € 77 ← 124 0 🗲 5.9 🌶 39 **4** 48 0.73 6 👄 0.94 ← 16 0.79 16.7 🜩 6.9 **→** 0 **¬ €** 9.7 **→** 5.3 29 → 6 ٦ ŧ C ŧ 4.4 3.9 ŧ ŧ ŧ ŧ 0.85 Quality Counts 4.3 4.2 DATA THAT DRIVES COMMUNITIES . ι. ... ₼ • • **t** 1 Ste ÷ 0 7 **f** 0 ŧ C N/A N/A ÷ ÷ و t t ← N/A N/A 🛥 N/A N/A a ç ŧ r ŧ N/A N/A ÷ ŧ Manono St Manono St Piilani St Piilani St 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 6:30 AM 6:45 AM 7:00 AM 2 4 7 7:15 AM 7:30 AM 4 0 7:45 AM 0 0 0 8 8:00 AM 8:15 AM 8:30 AM 5 3 8:45 AM Ō 9:00 AM 9:15 AM л Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru Right U Left Thru Right υ Left Thru Right U Left Thru Right υ 0 All Vehicles 0 0 0 0 0 0 0 Heavy Trucks Buses 0 0 Pedestrians õ Bicycles Scooters Comments:

Report generated on 4/15/2022 6:54 AM

LOCATION: Manono St -- Piilani St QC JOB #: 15767809 CITY/STATE: Hilo, HI DATE: Wed, Apr 6 2022 Peak-Hour: 3:45 PM -- 4:45 PM 467 0.93 0.6 ŧ Peak 15-Min: 3:45 PM -- 4:00 PM ŧ ŧ **↑** 0 0.6 ÷ L. . 53 + 18 + € 77 ← 133 19 🛥 0 🛊 t 0 + 0.8 0.77 9 🔸 0.98 ← 17 0.85 5.9 ÷ 0 + 0 7 40 🔸 13 🥆 ŧ ŧ h c 0.8 ŧ ŧ ÷ **↑** 0.6 0.94 Quality Counts 0.5 DATA THAT DRIVES COMMUNITIES . ι. .... ₼ • • **t** 0 Ate ÷ 0 7 **f** 0 ŧ C N/A N/A ÷ ÷ و t t ← N/A N/A 🛥 N/A N/A a ç ŧ r ŧ N/A N/A ÷ ŧ Manono St Manono St Piilani St Piilani St 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 3:00 PM 3:15 PM 3:30 PM 3:45 PM 4:00 PM 22 4:15 PM 2 94 4:30 PM 4:45 PM 1 5:00 PM 2 5 5:15 PM 5:30 PM 5:45 PM Δ Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru Right U Left Thru Right υ Left Thru Right U Left Thru Right υ All Vehicles 0 0 0 0 0 0 0 Heavy Trucks Buses 0 0 0 Pedestrians 0 0 Bicycles Scooters

Report generated on 4/14/2022 4:26 PM

Comments:

Peak-Hour: 7:30 AM 8:30 AM Peak 15-Min: 7:30 AM 7:45 AM Peak 15-Min: 7:30 AM 7:45 AM Peak 15-Min: 7:30 AM 7:45 AM 35 + 22 + 47 538 + 89 + 37 0.85 39 + 32 $7 + 25 + 3327 + 24 + 4956 + 49 + 4150 + 0$	
15-Min Count Period Manono St Manono St Manono St (Southbound) (Eastbound) (Westbound) Total He Beginning At Left Thrue Bielde LL Left Thrue Bielde LL Left Thrue Bielde LL	ourly otals
6:30 AM       8       33       19       0       13       27       6       0       16       46       3       0       4       48       4       0       227         6:30 AM       8       33       19       0       13       27       6       0       16       46       3       0       4       48       4       0       227         6:45 AM       8       44       13       0       9       22       9       0       7       65       1       0       6       61       5       0       250         7:00 AM       10       50       9       0       13       13       0       10       54       6       0       4       94       7       0       313         7:15 AM       14       53       12       0       17       43       13       0       24       57       13       0       4       94       7       0       313         7:30 AM       25       68       17       0       17       40       13       0       26       73       9       0       6       120       6       0       420       1	.139 .332
7:45 AM       27       60       7       0       18       61       21       0       20       64       8       0       7       91       4       0       388       1         8:00 AM       8       64       14       0       18       55       20       0       24       71       8       0       6       94       8       0       390       1         8:15 AM       12       52       11       0       22       48       15       0       19       60       7       0       6       92       7       0       390       1	470 547 549
8:30 AM       10       42       4       0       14       38       12       0       23       66       8       0       4       87       8       0       316       1         8:30 AM       10       42       4       0       14       38       12       0       23       66       8       0       4       87       8       0       316       1         8:45 AM       15       53       9       0       26       68       19       0       23       82       13       0       8       86       15       0       417       1         9:00 AM       11       33       13       0       17       43       24       0       16       73       12       0       8       93       15       0       358       1         9:15 AM       12       50       5       0       19       56       25       0       19       72       7       0       11       74       10       0       360       1	.445
Peak 15-Min Northbound Southbound Eastbound Westbound Total	474 442 451
All Vehicles         100         272         68         0         68         160         52         0         104         292         36         0         24         480         24         0         1680	.474 .442 .451
Heavy Trucks       12       4       0       0       4       8       0       0       8       0       40         Buses       0       4       0       0       8       0       40         Pedestrians       0       0       0       0       0       0       0       4         Bicycles       0<	.474 .442 .451

Report generated on 4/14/2022 4:25 PM

LOCATION: Manono St -- Kekuanaoa St QC JOB #: 15767812 DATE: Wed, Apr 6 2022 CITY/STATE: Hilo, HI Peak-Hour: 3:45 PM -- 4:45 PM 441 0.95 1.4 ŧ Peak 15-Min: 4:30 PM -- 4:45 PM ŧ ŧ **↑** 1.1 0.4 . . ι. 479 🗲 106 🌶 39 4 477 0.2 + 0.9 + € 0 € 0.4 0.95 385 🜩 0.98 ← 343 0.95 1.6 🜩 0.3 + 552 🔶 61 🥆 1.3 + 0 -€ 1.1 → 1.7 ŧ 1.9 4.2 ŧ ÷ ÷ ŧ 0.92 Quality Counts 0.5 1.9 DATA THAT DRIVES COMMUNITIES . ι. \$ • Ŧ • • **t** 0 A + 0 7 **f** 0 ŧ C N/A N/A ÷ و t -**~**+ t ← N/A N/A 🛥 N/A N/A a \* Þ ç r ŧ N/A N/A ÷ Manono St Manono St Kekuanaoa St Kekuanaoa St 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 3:00 PM 3:15 PM 3:30 PM 58 22 0 3:45 PM 4:00 PM 4:15 PM 4:30 PM 4:45 PM 5:00 PM 2 5:15 PM 5:30 PM 8 5:45 PM Δ Δ Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right U All Vehicles 8 0 0 Heavy Trucks Buses Pedestrians Bicycles , Scooters

Comments:

Report generated on 4/15/2022 6:58 AM

LOCATION: Mililani St -- Kekuanaoa St QC JOB #: 15767813 DATE: Wed, Apr 6 2022 CITY/STATE: Hilo, HI Peak-Hour: 7:30 AM -- 8:30 AM 0.73 ŧ Peak 15-Min: 7:45 AM -- 8:00 AM ÷ ŧ . . 564 🔶 17 🌶 539 3 = 0 + **t** 0 32 t 0.88 396 🜩 0.92 ← 527 0.85 2.5 🜩 3.2 + 2.4 🔹 0 🥆 € 0 → 2.4 418 🔿 5 🥆 ŧ ŧ ŧ ŧ 0.53 Quality Counts DATA THAT DRIVES COMMUNITIES . • • **t** 0 Ate + 0 7 **f** 0 ŧ C N/A N/A ÷ ♣ و t t ← N/A N/A 🛥 N/A N/A . a STOP ç ŧ r ŧ N/A N/A ÷ ŧ Mililani St Mililani St Kekuanaoa St Kekuanaoa St 15-Min Count Period Hourly Totals (Northbound) (Southbound) (Eastbound) (Westbound) Total Beginning At Left Thru Right υ Left Thru Right υ Left Thru Right υ Left Thru Right υ 6:30 AM 2 6:45 AM 7 7:00 AM 7 2 0 7:15 AM 7:30 AM 7:45 AM 8:00 AM 8:15 AM 15 8:30 AM 8 8:45 AM 2 9:00 AM 9:15 AM Northbound Southbound Eastbound Westbound Peak 15-Min Flowrates Total Left Thru Right U Left Thru Right U Left Thru Right U Left Thru Right υ 0 20 All Vehicles 0 0 Δ Δ 0 Δ Δ õ Heavy Trucks Buses 0 0 0 Pedestrians 0 õ Bicycles Scooters Comments:

Report generated on 4/14/2022 4:25 PM

Report generated on 4/14/2022 4:27 PM

Type of report: Tube Count - Volume Data
--

LOCATION: Manono St btwn Kuawa St and Piilani St QC JOB #: 15767816 **SPECIFIC LOCATION: DIRECTION: NB,SB** CITY/STATE: Hilo, HI DATE: Apr 6 2022 - Apr 6 2022 Average Weekday Average Week Tue Wed Thu Fri Sat Sun Mon Average Week Profile Start Time 6 Apr 22 **Hourly Traffic** Hourly Traffic 40 40 12:00 AM 40 01:00 AM 28 28 28 02:00 AM 34 34 34 03:00 AM 23 23 23 04:00 AM 57 57 57 05:00 AM 144 144 144 06:00 AM 328 328 328 07:00 AM 674 674 674 08:00 AM 724 724 724 09:00 AM 684 684 684 10:00 AM 749 749 749 11:00 AM 803 803 803 12:00 PM 818 818 818 01:00 PM 789 789 789 02:00 PM 715 715 715 03:00 PM 765 765 765 04:00 PM 834 834 834 05:00 PM 620 620 620 06:00 PM 471 471 471 07:00 PM 301 301 301 08:00 PM 236 236 236 09:00 PM 154 154 154 10:00 PM 102 102 102 11:00 PM 56 56 56 Day Total 10149 10149 10149 % Weekday 100% Average % Week 100% 100% Average AM Peak 11:00 AM 11:00 AM 11:00 AM Volume 803 803 803 4:00 PM 4:00 PM 4:00 PM PM Peak Volume 834 834 834 Comments:

Report generated on 4/14/2022 4:23 PM

### ArcGIS ∞ My Map





# ArcGIS ▽ My Map





# ArcGIS v My Map



			🛱 Print 👻 🛱 Measure 🛛 F	ind address or place	Q
					III     Kanoelehua Ave
Hawaii_PR_2018: Year_Record State_Code Route_ID Begin_Point End_Point AADT AADT_COMBINATION AADT_SINGLE_UNIT ACCESS_CONTROL_ COUNTY_CODE F_SYSTEM FACILITY TYPE Zoom to	2,018 15 2810 0.40 0.50 13,700 12 96 3 1 5 2				Airport Rd
		Community Maps Contributors, © OpenStreetMap, I	Microsoft, Esri, HERE, Garmin, SafeGraph, Ge	oTechnologies, Inc, METI/NASA, USGS, EPA, US Census Bu	





Appendix B – Bus Route Maps

									Rou	ıte 10: H	Hilo / Oce	an View								
										Effectiv	e April 4, 2	2022								
									Southbound	d to Oce	anview Pa	ark and Rid	e Lot							
				Hilo				Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volc Vill	ano age	Hawai'i Volcanoes National Park	Pahala	Punalulu	Naalehu	Waiohinu	Ocean View
	А	в	С	D	Е	F	G	н	I	J	к	L	м	Ν	О	Р	Q	R	S	т
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Crater Rim Drive @ Visitor Center	Kamani St @ Pahala Shopping Center	Punaluu Road @ Punaluu Beach Park	Hwy 11 @ nearside of Ohai Road (across Naalehu Elementary)	Hwy 11 @ farside of Kamaoa Road (across Wong Yuen Store)	Ocean View Park & Ride @ Prince Kuhio Blvd
Bus Stop ID#	100	101	103	105	106	107	110	901	903	ТВА	911	912	918	ТВА	809	808	807	812	814	802
	3:30 PM	3:34 PM	3:36 PM	3:39 PM	3:40 PM	3:41 PM	3:46 PM	3:56 PM	4:01 PM	4:06 PM	4:11 PM	4:21 PM	4:28 PM	4:29 PM	4:39 PM	5:14 PM	5:24 PM	5:39 PM	5:44 PM	6:04 PM

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. AM times are shown in lightface type. PM times are in boldface type. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a Hele-On Bus Stop sign or a red/white or blue "Bus Stop" sign. \$15.00 entrance fee or a visitor pass required to get off the bus at Hawai'i Volcanoes National Park. Entrance fees are vaild for 7 days.

									Route 1	). Hilo / O	coan Viov	M								
										tivo April		V								
-									Ellec		4, 2022									
					1		1		Noi	thbound t	o Hilo									
						Hawai'i														
	Ocean					National	Vol	ano		Mountain										
	View	Waiohinu	Naalehu	Punalulu	Pahala	Park	Vill	age	Glenwood	View	Fern Acres	Kurtistown	Kea'au				Hilo			
	Т	S	R	Q	Р	0	м	N	L	к	J	I	н	G	F	Е	D	С	В	Α
	Ocean View Park & Ride @ Prince Kuhio Blvd	Hwy 11 @ Kamaoa Road (in front Wong Yuen Store)	Hwy 11 @ Ohai Road (Naalehu Elementary School)	Punaluu Road @ Punaluu Beach Park	Kamani St @ Pahala Shopping Center	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau- Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawaii-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
top ID#	802	803	805	807	808	809	918	ТВА	919	920	ТВА	921	924	110	175	ТВА	ТВА	180	101	100
	6:40 AM	7:00 AM	7:05 AM	7:07 AM	7:30 AM	8:10 AM	8:12 AM	8:13 AM	8:16 AM	8:25 AM	8:27 AM	8:30 AM	8:35 AM	8:45 AM	8:50 AM	8:55 AM	8:56 AM	9:00 AM	9:03 AM	9:08 AM

						F	Route 11	: Red L	ine - Hilo /	Volcano					
								Effective	April 3, 2022						
						S	outhbound	l to Hawai'i	Volcanoes N	ational Park	ζ				
				Hilo				Kea'au	Kurtistown	Fern Acres	Mountain View	Glenwood	Volc Vill	cano age	Hawai'i Volcanoes National Park
	Α	В	С	D	Е	F	G	Н		J	K	L	М	N	0
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ UH-Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Old Volcano Road @ Kea'au Pahoa Rd (US Post Office)	Highway 11 @ Kurtistown Park (across bus shelter)	Highway 11 @ farside of N. Kulani Road	Highway 11 @ farside of Lauko Rd (Frankie's Pizza/Gas Station)	Highway 11 @ nearside of N. Glenwood Rd (Hirano Store)	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Crater Rim Drive @ Visitor Center
Bus Stop ID#	100	101	103	105	106	107	110	901	903	ТВА	911	912	918	ТВА	809
	5:00 AM	5:04 AM	5:06 AM	5:08 AM	5:11 AM	5:12 AM	5:17 AM	5:27 AM	5:32 AM	5:37 AM	5:42 AM	5:52 AM	5:59 AM	6:00 AM	6:10 AM
	7:40 AM	7:44 AM	7:46 AM	7:48 AM	7:51 AM	7:52 AM	7:57 AM	8:07 AM	8:12 AM	8:17 AM	8:22 AM	8:32 AM	8:39 AM	8:40 AM	8:50 AM
	10:40 AM	10:44 AM	10:46 AM	10:48 AM	10:51 AM	10:52 AM	10:57 AM	11:07 AM	11:12 AM	11:17 AM	11:22 AM	11:32 AM	11:39 AM	11:40 AM	11:50 AM
	1:40 PM	1:44 PM	1:46 PM	1:48 PM	1:51 PM	1:52 PM	1:57 PM	2:07 PM	2:12 PM	2:17 PM	2:22 PM	2:32 PM	2:39 PM	2:40 PM	2:50 PM
	4:40 PM	4:44 PM	4:46 PM	4:48 PM	4:51 PM	4:52 PM	4:57 PM	5:07 PM	5:12 PM	5:17 PM	5:22 PM	5:32 PM	5:39 PM	5:40 PM	5:50 PM

Monday through Friday only

Everyday service

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. AM times are shown in lightface type. **PM times are in boldface type**. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a Hele-On Bus Stop sign or a red/white or blue "Bus Stop" sign.

\$15.00 entrance fee or a visitor pass required to get off the bus at Hawai'i Volcanoes National Park. Entrance fees are vaild for 7 days.

						Route	11: Red L	ine - Hilo	) / Volca	no					
							Effective	April 3, 202	22						
							Northbo	ound to Hilo							
	Hawai'i Volcanoes National Park	Volc Villa	ano age	Glenwood	Mountain View	Fern Acres	Kurtistown	Kea'au				Hilo			
	0	М	N	L	K	J		H	G	F	E	D	C	В	Α
	Crater Rim Drive @ Visitor Center	Old Volcano Road @ across Volcano General Store	Cooper Center Park & Ride Lot	Highway 11 @ Glenwood Park (across Hirono Store)	Highway 11 @ St. Theresa's Church	Highway 11 @ S Kulani Road	Highway 11 @ Across from Kurtistown Park	Old Volcano Road @ Keaau-Pahoa Road (HMSA building, farside)	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Kawili Street @ across Hawaii Community College	W. Kawili St @ across from Waiakea High School	Kapiolani St @ Lanikaula St - Across from University of Hawaii-Hilo	Kilauea Avenue @ Kohala Street (Hilo Shopping Center)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Stop ID#	809	918	ТВА	919	920	ТВА	921	924	110	175	ТВА	ТВА	180	101	100
	6:15 AM	6:20 AM	6:21 AM	6:27 AM	6:33 AM	6:38 AM	6:43 AM	6:49 AM	7:02 AM	7:07 AM	7:08 AM	7:11 AM	7:15 AM	7:18 AM	7:22 AM
	9:15 AM	9:20 AM	9:21 AM	9:27 AM	9:33 AM	9:38 AM	9:43 AM	9:49 AM	10:02 AM	10:07 AM	10:08 AM	10:11 AM	10:15 AM	10:18 AM	10:22 AM
	12:15 PM	12:20 PM	12:21 PM	12:27 PM	12:33 PM	12:38 PM	12:43 PM	12:49 PM	1:02 PM	1:07 PM	1:08 PM	1:11 PM	1:15 PM	1:18 PM	1:22 PM
	3:15 PM	3:20 PM	3:21 PM	3:27 PM	3:33 PM	3:38 PM	3:43 PM	3:49 PM	4:02 PM	4:07 PM	4:08 PM	4:11 PM	4:15 PM	4:18 PM	4:22 PM
	6:15 PM	6:20 PM	6:21 PM	6:27 PM	6:33 PM	6:38 PM	6:43 PM	6:49 PM	7:02 PM	7:07 PM	7:08 PM	7:11 PM	7:15 PM	7:18 PM	7:22 PM

### Aloha & Welcome Aboard!

The friendly professionals at Hele-On welcome you! The County of Hawai'i Mass Transit Agency is pleased to provide this bus service to you! We hope that you will "Take the Trip!" and enjoy the safety, convenience and service that Hele-On has to offer!

### Service Hours

Hele-On bus service is generally available Monday-Sunday between the hours of 3:30 a.m. and 1:00 a.m. depending on the route. Please see route timetables for details. Sunday schedules operate on County observed holidays which are: New Year's Day, Dr. Martin Luther King Jr. Day, Presidents Day, Prince Kuhio Day, Good Friday, Memorial Day, King Kamehameha Day, Independence Day, Statehood Day, Labor Day, Election Day, Veterans Day, Thanksgiving Day and Christmas Day. Pay close attention to which routes operate on Sundays and County observed holidays.

#### Title VI of the Civil Rights Act of 1964

County of Hawai'i Mass Transit Agency operates it programs and services without regard to race, color and national origin in accordance with Title VI of the Civil Rights Act of 1964. Any person who believes that she or he has been aggrieved by any unlawful discriminatory practice under Title VI must file a complaint within 180 days of the alleged occurrence to FTA or County of Hawai'i. Additional details available on bus or website.

This information is available in alternative languages and formats by calling (808) 961-8744 or emailing heleonbus@hawaiicounty.gov

# Route operated Roberts Howoii

### Fares—Effective July 1, 2013

Fares are paid for each one-way trip. Bus operators only accept cash. No round trip fares are allowed. Fares are subject to change.

Exact fare is required — No change is given!

Category	General	Discount*
One Way	\$2.00	\$1.00
10-Ride Tickets available for purchase at Mo'oheau Bus Terminal	\$15.00	\$7.50
Monthly Pass available for purchase at Mo'oheau Bus Terminal	\$60.00	\$45.00
Children under 5 with a fare paying passenger	FREE	FREE
Transfer to another route within two hours	FREE	FREE

\*Discount fare is for students with valid school ID attending through college/university, seniors age 60 years old or older with valid ID showing age, persons with disabilities with a valid County of Hawai'i Mass Transit Agency Disability Discount Card and Medicare card holders with valid ID. All other passengers pay General fare.

10-Ride Tickets and Monthly Passes are available for sale at County of Hawai'i Mass Transit Agency offices, Mo'oheau Bus Terminal, or through the mail, by mailing a check, credit card or money order (payable to County of Hawai'i) & the number and type of passes/tickets requested to the County of Hawai'i Mass Transit Agency, 25 Aupuni Street, Hilo, HI 96720.

### Call Us.....We'll Be Around!

For comments, concerns, questions or suggestions regarding Hele-On transit services please contact the County of Hawai'i Mass Transit Agency by calling: (808) 961-8744, fax to: (808) 961-8745, writing to: County of Hawai'i Mass Transit Agency, 25 Aupuni Street, Hilo, HI 96720 or by emailing: heleonbus@hawaiicounty.gov.

John C. Andoh, Interim Mass Transit Administrator

### How To Use This Timetable

Each of our routes has a unique name and number and the route destination is on the front and right side of the bus. The schedule shows the departure times of the bus as it travels along the route. **Read the timetable from left to right.** 

Time points are shown on the map and on the timetable. See the timetable to estimate the arrival time at your bus stop. Since safe driving is always a priority, traffic, weather and other conditions can change arrival times. *Please plan accordingly.* 

### How To Ride A Hele-On Bus

Prior to boarding a Hele-On bus, wait at a blue and white Hele-On Bus Stop, red and white bus stop or Kona Trolley sign and wait on the proper side of the roadway. In some cases, you may need to flag the bus (at a safe pullover location) due to no sign being available. Arrive at least five (5) minutes before the bus is due to arrive.

- If you are unfamiliar with your stop, sit or stand behind the white line in the front of the bus and ask the bus operator to notify you when your stop is approaching.
- Ask the bus operator if you are not sure if the bus goes to your desired bus stop.
- Be mindful of changes in the schedule, overall conditions and weather.
- No eating, drinking or smoking of any kind.
- No boarding with surfboards or body boards.
- Electronic devices may be played with earphones set a at low level and talking on cellular phones are to not be used on the bus.
- Shoes and shirt are required to ride.
- No rowdy behavior on the bus.
- No spitting or expectorating on the bus.
- No flammable, explosive, sharp or toxic materials.
- No obstructing, fighting or interfering with the bus operator or bus operations.
- Only five bags are allowed on the bus.

Violators of these rules can result in a fine, suspension from riding the bus and/or imprisonment as defined in the Hawaii County Code 2-27-3 and/or Hawaii Revised Statutes.





Take The Trip!



7 day a week service between Downtown Hilo @ Mo'oheau Bus Terminal and King's Landing in Hilo

Telephone: (808) 961-8744 TDD/TTY: 711 www.heleonbus.org



Effective Sunday, October 3, 2021

		Route	101: Ke	aukaha	(Mond	ay-Satu	rday)					Ro	ute 101: k	Keaukah	a (Mond	ay-Satur	'day)	
			Effe	ctive Octo	ober 3, 202	21							Ef	fective Oc	tober 3, 20	21		
		(	Counter Clo	ockwise Loo	op to King'	s Landing						С	ounter Clock	wise Loop t	to Mo'oheau	u Bus Term	inal	
			1	Hilo										н	ilo			
	Α	R	н		J	K	L	М			М	L	N	0	P	Q	R	Α
	Mo'oheau Bus Terminal (329 Kamehameha Ave)	Banyan Drive @ Lili'uokalani Park and Gardens	Mokuea St @ Across Hilo Post Office	Airport Road @ Hilo International Airport	Mokuea St @ Akahana St/ Hilo Post Office	Kalanianaole Ave @ Silva St/Keaukaha Market	Kalanianaole Ave @ Seaside Restaurant	End of Kalanianaole Ave @ King's Landing/Richardson's Beach Park			End of Kalanianaole Ave @ King's Landing/Richardson's Beach Park	Kalanianaole Ave @ Carlsmith Beach Park	Kalanianaole Ave @ Onehakahaka Rd - Onehakahaka Beach Park	Kalanianaole Ave @ Pua Ave - UHH Pacific Aquaculture Center	Kalanianaole Ave @ Kumau St - Oceanfront Kitchen	Kalanianaole Ave @ Pond's Restaurant before Banyan Way	Banyan Drive @ Lili'uokalani Park and Gardens	Mo'oheau Bus Terminal (329 Kamehameha Ave)
Bus Stop ID#	100	110	111	112	111	114	118	120	Ste	Bus op ID#	120	121	122	123	124	125	126	100
	6:15 AM	6:20 AM	6:30 AM	6:32 AM	6:33 AM	6:39 AM	6:41 AM	6:43 AM			6:53 AM	6:55 AM	7:00 AM	7:01 AM	7:02 AM	7:03 AM	7:06 AM	7:11 AM
	7:15 AM	7:20 AM	7:30 AM	7:32 AM	7:33 AM	7:39 AM	7:41 AM	7:43 AM			7:53 AM	7:55 AM	8:00 AM	8:01 AM	8:02 AM	8:03 AM	8:06 AM	8:11 AM
	8:15 AM	8:20 AM	8:30 AM	8:32 AM	8:33 AM	8:39 AM	8:41 AM	8:43 AM			8:53 AM	8:55 AM	9:00 AM	9:01 AM	9:02 AM	9:03 AM	9:06 AM	9:11 AM
	9:15 AM	9:20 AM	9:30 AM	9:32 AM	9:33 AM	9:39 AM	9:41 AM	9:43 AM			9:53 AM	9:55 AM	10:00 AM	10:01 AM	10:02 AM	10:03 AM	10:06 AM	10:11 AM
	10:15 AM	10:20 AM	10:30 AM	10:32 AM	10:33 AM	10:39 AM	10:41 AM	10:43 AM			10:53 AM	10:55 AM	11:00 AM	11:01 AM	11:02 AM	11:03 AM	11:06 AM	11:11 AM
	11:15 AM	11:20 AM	11:30 AM	11:32 AM	11:33 AM	11:39 AM	11:41 AM	11:43 AM			11:53 AM	11:55 AM	12:00 PM	12:01 PM	12:02 PM	12:03 PM	12:06 PM	12:11 PM
	12:15 PM	12:20 PM	12:30 PM	12:32 PM	12:33 PM	12:39 PM	12:41 PM	12:43 PM			12:53 PM	12:55 PM	1:00 PM	1:01 PM	1:02 PM	1:03 PM	1:06 PM	1:11 PM
	1:15 PM	1:20 PM	1:30 PM	1:32 PM	1:33 PM	1:39 PM	1:41 PM	1:43 PM			1:53 PM	1:55 PM	2:00 PM	2:01 PM	2:02 PM	2:03 PM	2:06 PM	2:11 PM
	2:15 PM	2:20 PM	2:30 PM	2:32 PM	2:33 PM	2:39 PM	2:41 PM	2:43 PM			2:53 PM	2:55 PM	3:00 PM	3:01 PM	3:02 PM	3:03 PM	3:06 PM	3:11 PM
	3:15 PM	3:20 PM	3:30 PM	3:32 PM	3:33 PM	3:39 PM	3:41 PM	3:43 PM			3:53 PM	3:55 PM	4:00 PM	4:01 PM	4:02 PM	4:03 PM	4:06 PM	4:11 PM
	4:15 PM	4:20 PM	4:30 PM	4:32 PM	4:33 PM	4:39 PM	4:41 PM	4:43 PM			4:53 PM	4:55 PM	5:00 PM	5:01 PM	5:02 PM	5:03 PM	5:06 PM	5:11 PM
	5:15 PIVI	5:20 PM	5:30 PM	5:32 PM	5:33 PM	5:39 PM	5:41 PM	5:43 PM			5:53 PM	0:55 PM	0:00 PM	0:01 PM	0:02 PM	0:03 PM	0:06 PM	0:11 PM
	0:15 PW	0:20 PW	0:30 PM	0:32 PM	0:33 PW	0:39 PW	0:41 PW	0.43 PW			0:53 MM	0:55 PW	7:00 PW	7:01 PM	7:02 PW	7:03 PW	1:00 PW	7.11 PW
	1.19 -14	1.20 FIV	1.30 - 10	1.32 FM	1.33 - 11	1.39 111	1.41 111	1.43 111										



				F	Route 10	1: Keau	kaha (Su	nday & I	Holiday	s)						Rou	ite 101: K	eaukaha	a (Sunda	ıy & Holi	days)	
					Cou	nter Clockv	vise Loop to	King's Lan	ding							С	ounter Clock	wise Loop t	to Mo'oheai	u Bus Term	inal	
						Effectiv	e October	3, 2021									Ef	fective Oc	tober 3, 20	21		
					_		Hilo	_								_		н	ilo			_
	Α	в	С	D	E	F	G	н	- I	J	K	L	M		М	L	N	0	P	Q	R	Α
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii-Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ UH-Hawaii Community College	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Mokuea St @ Across Hilo Post Office	Airport Road @ Hilo International Airport	Mokuea St @ Akahana St/ Hilo Post Office	Kalanianaole Ave @ Silva St/Keaukaha Market	Kalanianaole Ave @ Seaside Resturant	End of Kalanianaole Ave @ King's _anding/Richardson's Beach Park		End of Kalanianaole Ave @ King's _anding/Richardson's Beach Park	Kalanianaole Ave @ Carlsmith Beach Park	Kalanianaole Ave @ Onehakahaka Rd - Onehakahaka Beach Park	Kalanianaole Ave @ Pua Ave - UHH Pacific Aquaculture Center	Kalanianaole Ave @ Kumau St - Oceanfront Kitchen	Kalanianaole Ave @ Pond's Restaurant before Banyan Way	Banyan Drive @ Lili'uokalani Park and Gardens	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Sto ID	<sup>р</sup> # 100	101	103	105	106	107	110	111	112	111	114	118	120	Bus Sto ID	₽ # 120	121	122	123	124	125	126	100
	9:15 AM	9:19 AM	9:21 AM	9:23 AM	9:24 AM	9:25 AM	9:30 AM	9:40 AM	9:42 AM	9:43 AM	9:49 AM	9:51 AM	9:53 AM		9:53 AM	9:55 AM	10:00 AM	10:01 AM	10:02 AM	10:03 AM	10:06 AM	10:11 AN
	10:15 AM	10:19 AM	10:21 AM	10:23 AM	10:24 AM	10:25 AM	10:30 AM	10:40 AM	10:42 AM	10:43 AM	10:49 AM	10:51 AM	10:53 AM		10:53 AM	10:55 AM	11:00 AM	11:01 AM	11:02 AM	11:03 AM	11:06 AM	11:11 AN
	11:15 AM	11:19 AM	11:21 AM	11:23 AM	11:24 AM	11:25 AM	11:30 AM	11:40 AM	11:42 AM	11:43 AM	11:49 AM	11:51 AM	11:53 AM		11:53 AM	11:55 AM	12:00 PM	12:01 PM	12:02 PM	12:03 PM	12:06 PM	12:11 PN
	12:15 PM	12:19 PM	12:21 PM	12:23 PM	12:24 PM	12:25 PM	12:30 PM	12:40 PM	12:42 PM	12:43 PM	12:49 PM	12:51 PM	12:53 PM		12:53 PM	12:55 PM	1:00 PM	1:01 PM	1:02 PM	1:03 PM	1:06 PM	1:11 PM
	1:15 PM	1:19 PM	1:21 PM	1:23 PM	1:24 PM	1:25 PM	1:30 PM	1:40 PM	1:42 PM	1:43 PM	1:49 PM	1:51 PM	1:53 PM		1:53 PM	1:55 PM	2:00 PM	2:01 PM	2:02 PM	2:03 PM	2:06 PM	2:11 PM
	2:15 PM	2:19 PM	2:21 PM	2:23 PM	2:24 PM	2:25 PM	2:30 PM	2:40 PM	2:42 PM	2:43 PM	2:49 PM	2:51 PM	2:53 PM		2:53 PM	2:55 PM	3:00 PM	3:01 PM	3:02 PM	3:03 PM	3:06 PM	3:11 PM
	3:15 PM	3:19 PM	3:21 PM	3:23 PM	3:24 PM	3:25 PM	3:30 PM	3:40 PM	3:42 PM	3:43 PM	3:49 PM	3:51 PM	3:53 PM		3:53 PM	3:55 PM	4:00 PM	4:01 PM	4:02 PM	4:03 PM	4:06 PM	4:11 PM
	4:15 PM	4:19 PM	4:21 PM	4:23 PM	4:24 PM	4:25 PM	4:30 PM	4:40 PM	4:42 PM	4:43 PM	4:49 PM	4:51 PM	4:53 PM		4:53 PM	4:55 PM	5:00 PM	5:01 PM	5:02 PM	5:03 PM	5:06 PM	5:11 PM
	5:15 PM	5:19 PM	5:21 PM	5:23 PM	5:24 PM	5:25 PM	5:30 PM	5:40 PM	5:42 PM	5:43 PM	5:49 PM	5:51 PM	5:53 PM									

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a bus shelter, a Kona Trolley Stop sign, a Hele-On Bus Stop or a red/white or blue Bus Stop sign.

- - - means timepoint is not served.

AM times are shown in lightface type. **PM times** are in **boldface type**.



Please recycle. Share this bus schedule with someone else if you do not need it.

					Route 1	03: Waia	akea-Uka				
				South	bound to H	laihai Stree	et @ Kupula	u Road			
					Effe	ctive April	4, 2022				
						Hilo					
	Α	В	С	D	E	F	н	I	J	K	L
	Mo'oheau Bus Terminal (329 Kamemehameha Ave)	Aupuni Street @ Pauahi Street (Aupuni Center, County Building)	Kilauea Avenue @ Across Kohala Street (Across from Hilo Shopping Center)	Kapiolani St @ Lanikaula St - University of Hawaii- Hilo	W. Kawili St @ Waiakea High School	Kawili Street @ Hawaii Community College	Kilauea Avenue @ East Kahaopea Street	Kinoole St @ W. Kahaopea St - Kino'ole Plaza/Kino'ole Sr Housing	Kilauea Avenue @ Palai Street	Haihai Street @ before Laula Street - Hilo Municiple Golf Course	Haihai St @ Kupulau Road
Bus Stop ID#	100	101	103	105	106	107	158	159	160	162	167
							6:33 AM	6:34 AM	6:35 AM	6:36 AM	6:37 AM
	7:15 AM	7:20 AM	7:23 AM	7:27 AM	7:28 AM	7:29 AM	7:33 AM	7:34 AM	7:35 AM	7:36 AM	7:37 AM
	8:15 AM	8:20 AM	8:23 AM	8:27 AM	8:28 AM	8:29 AM	8:33 AM	8:34 AM	8:35 AM	8:36 AM	8:37 AM
	9:15 AM	9:20 AM	9:23 AM	9:27 AM	9:28 AM	9:29 AM	9:33 AM	9:34 AM	9:35 AM	9:36 AM	9:37 AM
	10:15 AM	10:20 AM	10:23 AM	10:27 AM	10:28 AM	10:29 AM	10:33 AM	10:34 AM	10:35 AM	10:36 AM	10:37 AM
	11:15 AM	11:20 AM	11:23 AM	11:27 AM	11:28 AM	11:29 AM	11:33 AM	11:34 AM	11:35 AM	11:36 AM	11:37 AM
	12:15 PM	12:20 PM	12:23 PM	12:27 PM	12:28 PM	12:29 PM	12:33 PM	12:34 PM	12:35 PM	12:36 PM	12:37 PM
	1:15 PM	1:20 PM	1:23 PM	1:27 PM	1:28 PM	1:29 PM	1:33 PM	1:34 PM	1:35 PM	1:36 PM	1:37 PM
	2:15 PM	2:20 PM	2:23 PM	2:27 PM	2:28 PM	2:29 PM	2:33 PM	2:34 PM	2:35 PM	2:36 PM	2:37 PM
	3:15 PM	3:20 PM	3:23 PM	3:27 PM	3:28 PM	3:29 PM	3:33 PM	3:34 PM	3:35 PM	3:36 PM	3:37 PM
	4:15 PM	4:20 PM	4:23 PM	4:27 PM	4:28 PM	4:29 PM	4:33 PM	4:34 PM	4:35 PM	4:36 PM	4:37 PM
	5:15 PM	5:20 PM	5:23 PM	5:27 PM	5:28 PM	5:29 PM	5:33 PM	5:34 PM	5:35 PM	5:36 PM	5:37 PM
	6:15 PM	6:20 PM	6:23 PM	6:27 PM	6:28 PM	6:29 PM	6:33 PM	6:34 PM	6:35 PM	6:36 PM	6:37 PM

	Rou	ute 103:	Waiakea-	Uka
	Eastbo	und to Mo'	oheau Bus T	erminal
		Effective .	April 4, 2022	
			Hilo	
	L	М	G	Α
	Haihai St @ Kupulau Road	W. Kawailani St @ Iwalani Street - Hilo Life Care Center	Ohu Ohu Street @ Prince Kuhio Plaza (Macy's Mens, Children & Home)	Mo'oheau Bus Terminal (329 Kamemehameha Ave)
Bus Stop ID#	167	168	110	100
	6:37 AM	6:38 AM	6:48 AM	6:58 AM
	7:37 AM	7:38 AM	7:48 AM	7:58 AM
	8:37 AM	8:38 AM	8:48 AM	8:58 AM
	9:37 AM	9:38 AM	9:48 AM	9:58 AM
	10:37 AM	10:38 AM	10:48 AM	10:58 AM
	11:37 AM	11:38 AM	11:48 AM	11:58 AM
	12:37 PM	12:38 PM	12:48 PM	12:58 PM
	1:37 PM	1:38 PM	1:48 PM	1:58 PM
	2:37 PM	2:38 PM	2:48 PM	2:58 PM
	3:37 PM	3:38 PM	3:48 PM	3:58 PM
	4:37 PM	4:38 PM	4:48 PM	4:58 PM
	5:37 PM	5:38 PM	5:48 PM	5:58 PM
	6:37 PM	6:38 PM	6:48 PM	

This route operates Monday-Saturday only. There is no Sunday or holiday service.

--- = bus does not serve timepoint.

To read the timetable, read from left to right to follow the course of the route and then read down for the times that the bus operates. AM times are shown in lightface type. **PM times are in boldface type**. Schedules are subject to change without notice. Times are approximate and may vary depending on traffic conditions, weather and other conditions.

Not all Hele-On bus stops are shown. Please flag the bus along its route at safe intersections where the bus can safely pull over or board at a Hele-On Bus Stop sign or a red/white or blue "Bus Stop" sign.

# Appendix C – Analysis Report Existing Conditions

HCM 6th Signalized Intersection Summary

2022 AM - Base Conditions (v) 04/15/2022

	-			
1: Manono	Street/Lihiwai Street &	Route 19	(Mamalahoa Highway)	

	•	-	7	1	-	*	1	1	1	1	Ŧ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>	1	7	<b>^</b>	1	7	ŧÎ,		7	ħ	
Traffic Volume (veh/h)	88	470	290	57	720	12	180	61	68	26	70	108
Future Volume (veh/h)	88	470	290	57	720	12	180	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	528	326	62	783	13	200	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	371	1501	674	386	1492	666	331	182	204	340	101	157
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.10	0.23	0.23	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	528	326	62	783	13	200	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	7.8	11.4	1.5	12.6	0.4	7.0	0.0	5.5	1.0	0.0	8.2
Cycle Q Clear(g_c), s	2.4	7.8	11.4	1.5	12.6	0.4	7.0	0.0	5.5	1.0	0.0	8.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	371	1501	674	386	1492	666	331	0	386	340	0	258
V/C Ratio(X)	0.27	0.35	0.48	0.16	0.52	0.02	0.60	0.00	0.37	0.08	0.00	0.74
Avail Cap(c_a), veh/h	408	1501	674	417	1492	666	331	0	1044	405	0	979
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.1	14.5	15.5	11.4	16.3	12.8	22.9	0.0	24.9	25.9	0.0	30.9
Incr Delay (d2), s/veh	0.4	0.6	2.5	0.2	1.3	0.1	3.1	0.0	0.6	0.1	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.9	2.9	4.3	0.5	4.9	0.1	3.0	0.0	2.1	0.4	0.0	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.5	15.1	18.0	11.6	17.6	12.8	26.0	0.0	25.5	26.0	0.0	35.0
LnGrp LOS	В	В	В	В	В	В	С	Α	С	С	Α	<u>D</u>
Approach Vol, veh/h		953			858			344			219	
Approach Delay, s/veh		15.8			17.1			25.8			33.9	
Approach LOS		В			В			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	38.0	7.2	22.4	9.4	37.3	13.0	16.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	8.0	44.0				
Max Q Clear Time (g_c+l1), s	3.5	13.4	3.0	7.5	4.4	14.6	9.0	10.2				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.9	0.0	5.0	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			19.4									
HCM 6th LOS			В									

#### Intersection

Int Delay, s/veh 5.7 EBL EBR NBL NBT SBT SBR Movement **↑↑ ↑↑** 0 659 Lane Configurations Y ٦ Traffic Vol, veh/h 10 52 201 52 Future Vol, veh/h 10 52 201 0 659 52 0 Conflicting Peds, #/hr 0 2 0 0 2 Sign Control Stop Stop Free Free Free Free RT Channelized None -None -None -Storage Length 0 425 ----Veh in Median Storage, # 0 --0 0 -Grade, % 0 0 0 ---Peak Hour Factor 92 86 86 82 82 92 Heavy Vehicles, % 0 6 4 0 9 23 Mvmt Flow 12 60 245 0 716 57

Major/Minor	Minor2	Ν	/lajor1	Majo	or2		
Conflicting Flow All	1237	389	775	0	-	0	
Stage 1	747	-	-	-	-	-	
Stage 2	490	-	-	-	-	-	
Critical Hdwy	6.25	7.22	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.96	3.14	-	-	-	
Pot Cap-1 Maneuver	202	512	495	-	-	-	
Stage 1	358	-	-	-	-	-	
Stage 2	568	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	· 101	511	494	-	-	-	
Mov Cap-2 Maneuver	· 101	-	-	-	-	-	
Stage 1	180	-	-	-	-	-	
Stage 2	567	-	-	-	-	-	
Annroach	FR		NR		SR		
HCM Control Delay	20.2		19.3		0		
HCM LOS	C		10.0		v		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	494	- 309	-	-
HCM Lane V/C Ratio	0.496	- 0.233	-	-
HCM Control Delay (s)	19.3	- 20.2	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	2.7	- 0.9	-	-
# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	17	6	6	31	16	77	8	205	76	49	315	27
Future Vol, veh/h	17	6	6	31	16	77	8	205	76	49	315	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control S	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	ŧ -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	241	89	56	362	31

Major/Minor	Minor2			Minor1		ľ	Major1			Major2			
Conflicting Flow All	854	839	379	802	810	287	394	0	0	330	0	0	
Stage 1	491	491	-	304	304	-	-	-	-	-	-	-	
Stage 2	363	348	-	498	506	-	-	-	-	-	-	-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-	
Pot Cap-1 Maneuver	269	286	672	294	307	740	1176	-	-	1218	-	-	
Stage 1	543	524	-	691	652	-	-	-	-	-	-	-	
Stage 2	638	608	-	541	530	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	209	267	671	269	286	739	1175	-	-	1218	-	-	
Mov Cap-2 Maneuver	209	267	-	269	286	-	-	-	-	-	-	-	
Stage 1	538	493	-	685	646	-	-	-	-	-	-	-	
Stage 2	531	603	-	494	498	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	21.6	17.2	0.2	1	
HCM LOS	С	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1175	-	-	257	450	1218	-	-	
HCM Lane V/C Ratio	0.008	-	-	0.155	0.349	0.046	-	-	
HCM Control Delay (s)	8.1	0	-	21.6	17.2	8.1	0	-	
HCM Lane LOS	А	А	-	С	С	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	0.5	1.5	0.1	-	-	

	٠	-	7	1	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		7	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	89	268	32	25	397	25	72	244	49	75	204	69
Future Volume (veh/h)	89	268	32	25	397	25	72	244	49	75	204	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	298	36	29	467	29	87	294	59	86	234	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	287	577	70	394	620	38	346	459	92	311	416	140
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1624	196	1753	1742	108	1725	1476	296	1697	1338	452
Grp Volume(v), veh/h	99	0	334	29	0	496	87	0	353	86	0	313
Grp Sat Flow(s),veh/h/ln	1781	0	1820	1753	0	1851	1725	0	1773	1697	0	1789
Q Serve(g_s), s	3.1	0.0	13.0	0.9	0.0	21.2	3.0	0.0	15.4	3.0	0.0	13.1
Cycle Q Clear(g_c), s	3.1	0.0	13.0	0.9	0.0	21.2	3.0	0.0	15.4	3.0	0.0	13.1
Prop In Lane	1.00		0.11	1.00		0.06	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	287	0	647	394	0	658	346	0	551	311	0	557
V/C Ratio(X)	0.35	0.00	0.52	0.07	0.00	0.75	0.25	0.00	0.64	0.28	0.00	0.56
Avail Cap(c_a), veh/h	287	0	647	394	0	658	346	0	551	311	0	557
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	0.0	22.9	16.8	0.0	25.5	20.1	0.0	26.7	20.5	0.0	25.9
Incr Delay (d2), s/veh	3.3	0.0	2.9	0.4	0.0	7.8	1.7	0.0	5.6	2.2	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.5	0.0	5.8	0.4	0.0	10.2	1.3	0.0	7.1	1.3	0.0	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.6	0.0	25.8	17.2	0.0	33.4	21.8	0.0	32.3	22.7	0.0	30.0
LnGrp LOS	С	А	С	В	А	С	С	Α	С	С	Α	C
Approach Vol, veh/h		433			525			440			399	
Approach Delay, s/veh		25.1			32.5			30.2			28.4	
Approach LOS		С			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	5.0	17.4	2.9	15.0	5.0	15.1	5.1	23.2				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.7	0.0	1.4	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			29.2									
HCM 6th LOS			С									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	17	396	5	5	527	7	8	1	8	6	3	29
Future Vol, veh/h	17	396	5	5	527	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	, # -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	450	6	6	620	8	15	2	15	8	4	40

Major/Minor	Major1		Ν	/lajor2		N	Minor1		Ν	/linor2			
Conflicting Flow All	630	0	0	459	0	0	1152	1136	456	1138	1135	626	
Stage 1	-	-	-	-	-	-	494	494	-	638	638	-	
Stage 2	-	-	-	-	-	-	658	642	-	500	497	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	962	-	-	1113	-	-	176	204	609	180	204	488	
Stage 1	-	-	-	-	-	-	561	550	-	468	474	-	
Stage 2	-	-	-	-	-	-	457	472	-	557	548	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	960	-	-	1110	-	-	154	196	607	169	196	487	
Mov Cap-2 Maneuver	· -	-	-	-	-	-	154	196	-	169	196	-	
Stage 1	-	-	-	-	-	-	544	534	-	454	469	-	
Stage 2	-	-	-	-	-	-	413	467	-	527	532	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.4			0.1			22.1			17.3			
HCM LOS							С			С			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	242	960	-	-	1110	-	-	344
HCM Lane V/C Ratio	0.133	0.02	-	-	0.005	-	-	0.151
HCM Control Delay (s)	22.1	8.8	0	-	8.3	0	-	17.3
HCM Lane LOS	С	А	А	-	А	А	-	С
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.5

2022 PM - Base Conditions 04/15/2022

	٠	→	7	1	+	*	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>^</b>	1	7	ef (		7	ħ	
Traffic Volume (veh/h)	96	575	389	64	605	9	265	54	45	21	70	97
Future Volume (veh/h)	96	575	389	64	605	9	265	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	612	414	70	658	10	305	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	376	1394	612	322	1382	615	428	274	230	343	115	158
Arrive On Green	0.05	0.39	0.39	0.05	0.38	0.38	0.16	0.29	0.29	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	612	414	70	658	10	305	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.8	10.3	17.9	1.9	11.3	0.3	10.9	0.0	4.1	1.0	0.0	9.6
Cycle Q Clear(g_c), s	2.8	10.3	17.9	1.9	11.3	0.3	10.9	0.0	4.1	1.0	0.0	9.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	376	1394	612	322	1382	615	428	0	504	343	0	273
V/C Ratio(X)	0.27	0.44	0.68	0.22	0.48	0.02	0.71	0.00	0.23	0.08	0.00	0.76
Avail Cap(c_a), veh/h	452	1394	612	367	1382	615	469	0	987	404	0	773
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	18.5	20.8	14.5	19.2	15.8	22.4	0.0	22.1	27.6	0.0	33.1
Incr Delay (d2), s/veh	0.4	1.0	5.9	0.3	1.2	0.0	4.6	0.0	0.2	0.1	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.1	4.2	7.3	0.7	4.6	0.1	4.9	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.1	19.5	26.7	14.8	20.3	15.8	27.0	0.0	22.3	27.7	0.0	37.5
LnGrp LOS	В	В	С	В	С	В	С	А	С	С	А	D
Approach Vol, veh/h		1128			738			419			235	
Approach Delay, s/veh		21.8			19.7			25.7			36.4	
Approach LOS		С			В			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	37.0	7.2	29.0	9.5	36.5	18.1	18.1				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	15.0	37.0				
Max Q Clear Time (g c+l1), s	3.9	19.9	3.0	6.1	4.8	13.3	12.9	11.6				
Green Ext Time (p_c), s	0.0	4.5	0.0	0.7	0.1	4.0	0.2	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			23.2									
HCM 6th LOS			С									

Int Delay, s/veh 4.5 EBL Movement EBR NBL NBT SBT SBR Y **\*\*\* \*\*\*** 0 874 Lane Configurations ٦ 8 Traffic Vol, veh/h 109 129 39 Future Vol, veh/h 8 109 129 0 874 39 Conflicting Peds, #/hr 0 0 0 0 0 0 Sign Control Stop Stop Free Free Free Free RT Channelized -None -None -None Storage Length 0 425 ----Veh in Median Storage, # 0 --0 0 -Grade, % 0 0 0 ---Peak Hour Factor 81 90 90 81 92 92 Heavy Vehicles, % 0 3 4 3 3 0 Mvmt Flow 10 135 140 0 971 43

Major/Minor	Minor2	1	Major1	Majo	or2		 
Conflicting Flow All	1273	507	1014	0	-	0	
Stage 1	993	-	-	-	-	-	
Stage 2	280	-	-	-	-	-	
Critical Hdwy	6.25	7.16	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.93	3.14	-	-	-	
Pot Cap-1 Maneuver	193	435	380	-	-	-	
Stage 1	253	-	-	-	-	-	
Stage 2	722	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	122	435	380	-	-	-	
Mov Cap-2 Maneuver	122	-	-	-	-	-	
Stage 1	160	-	-	-	-	-	
Stage 2	722	-	-	-	-	-	
Approach	EB		NB		SB		
HCM Control Delay, s	20.8		19.9		0		
HCM LOS	С						

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	380	- 370	-	-
HCM Lane V/C Ratio	0.369	- 0.39	-	-
HCM Control Delay (s)	19.9	- 20.8	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	1.7	- 1.8	-	-

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	9	13	39	17	77	6	263	67	76	361	30
Future Vol, veh/h	18	9	13	39	17	77	6	263	67	76	361	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	280	71	82	388	32

Major/Minor	Minor2		Ν	1inor1		ľ	Major1		Ν	/lajor2			
Conflicting Flow All	955	933	406	911	914	318	422	0	0	351	0	0	
Stage 1	570	570	-	328	328	-	-	-	-	-	-	-	
Stage 2	385	363	-	583	586	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	240	268	649	257	269	727	1148	-	-	1219	-	-	
Stage 1	510	509	-	689	640	-	-	-	-	-	-	-	
Stage 2	642	628	-	502	491	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	182	242	648	224	243	726	1146	-	-	1219	-	-	
Mov Cap-2 Maneuver	182	242	-	224	243	-	-	-	-	-	-	-	
Stage 1	505	463	-	684	636	-	-	-	-	-	-	-	
Stage 2	539	624	-	435	447	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	22.6	20.9	0.1	1.3	
HCM LOS	С	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1146	-	-	256	380	1219	-	-
HCM Lane V/C Ratio	0.006	-	-	0.203	0.412	0.067	-	-
HCM Control Delay (s)	8.2	0	-	22.6	20.9	8.2	0	-
HCM Lane LOS	А	А	-	С	С	А	А	-
HCM 95th %tile Q(veh)	0	-	-	0.7	2	0.2	-	-

	٠	-	7	*	•	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ţ,		7	ħ		7	ħ		7	ħ	
Traffic Volume (veh/h)	106	385	61	95	343	39	46	214	48	93	258	90
Future Volume (veh/h)	106	385	61	95	343	39	46	214	48	93	258	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	405	64	100	361	41	50	233	52	98	272	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	362	560	89	303	577	66	321	460	103	380	418	146
Arrive On Green	0.07	0.36	0.36	0.06	0.34	0.34	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1575	249	1795	1675	190	1810	1479	330	1795	1344	469
Grp Volume(v), veh/h	112	0	469	100	0	402	50	0	285	98	0	367
Grp Sat Flow(s),veh/h/ln	1795	0	1824	1795	0	1865	1810	0	1810	1795	0	1814
Q Serve(g_s), s	3.5	0.0	20.1	3.2	0.0	16.2	1.6	0.0	11.6	3.3	0.0	15.7
Cycle Q Clear(g_c), s	3.5	0.0	20.1	3.2	0.0	16.2	1.6	0.0	11.6	3.3	0.0	15.7
Prop In Lane	1.00		0.14	1.00		0.10	1.00		0.18	1.00		0.26
Lane Grp Cap(c), veh/h	362	0	649	303	0	642	321	0	563	380	0	564
V/C Ratio(X)	0.31	0.00	0.72	0.33	0.00	0.63	0.16	0.00	0.51	0.26	0.00	0.65
Avail Cap(c_a), veh/h	362	0	649	303	0	642	321	0	563	380	0	564
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.3	0.0	25.2	19.4	0.0	24.7	20.0	0.0	25.3	19.9	0.0	26.8
Incr Delay (d2), s/veh	2.2	0.0	6.9	2.9	0.0	4.6	1.0	0.0	3.2	1.6	0.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	9.4	1.5	0.0	7.6	0.7	0.0	5.3	1.5	0.0	7.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.5	0.0	32.0	22.3	0.0	29.2	21.0	0.0	28.6	21.5	0.0	32.5
LnGrp LOS	С	A	С	С	A	С	С	A	С	С	A	<u> </u>
Approach Vol, veh/h		581			502			335			465	
Approach Delay, s/veh		29.8			27.8			27.5			30.2	
Approach LOS		С			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	11.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	6.0	31.0				
Max Q Clear Time (g_c+I1), s	5.3	13.6	5.2	22.1	3.6	17.7	5.5	18.2				
Green Ext Time (p_c), s	0.0	1.3	0.0	2.0	0.0	1.6	0.0	1.9				
Intersection Summary												
HCM 6th Ctrl Delay			29.0									
HCM 6th LOS			С									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	538	16	4	478	9	1	4	14	0	2	41
Future Vol, veh/h	18	538	16	4	478	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
M∨mt Flow	19	560	17	4	493	9	1	6	21	0	3	57

Major/Minor	Major1		ſ	Major2			Minor1		I	Minor2			
Conflicting Flow All	504	0	0	578	0	0	1144	1120	570	1128	1124	500	
Stage 1	-	-	-	-	-	-	608	608	-	508	508	-	
Stage 2	-	-	-	-	-	-	536	512	-	620	616	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	1071	-	-	1006	-	-	179	208	512	183	207	565	
Stage 1	-	-	-	-	-	-	486	489	-	551	542	-	
Stage 2	-	-	-	-	-	-	532	540	-	479	485	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1069	-	-	1005	-	-	155	201	512	167	200	564	
Mov Cap-2 Maneuver	-	-	-	-	-	-	155	201	-	167	200	-	
Stage 1	-	-	-	-	-	-	473	476	-	536	538	-	
Stage 2	-	-	-	-	-	-	473	536	-	442	472	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.1			16			12.8			
HCM LOS							С			В			
Minor Long/Major Mum	.+ N		EDI	ГРТ	грр								

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR S	SBLn1	
Capacity (veh/h)	354	1069	-	-	1005	-	-	520	
HCM Lane V/C Ratio	0.079	0.018	-	-	0.004	-	-	0.115	
HCM Control Delay (s)	16	8.4	0	-	8.6	0	-	12.8	
HCM Lane LOS	С	А	А	-	А	А	-	В	
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4	

Appendix D – Analysis Report Future Without Project Conditions

2027 AM - Without Project 04/19/2022

	٠	-	7	*	+	*	1	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	<b>^</b>	1	7	<b>^</b>	1	٦	ţ,		7	ţ,	
Traffic Volume (veh/h)	88	500	309	57	767	12	193	61	68	26	70	108
Future Volume (veh/h)	88	500	309	57	767	12	193	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	562	347	62	834	13	214	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	348	1495	671	366	1487	664	345	190	212	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	562	347	62	834	13	214	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	8.6	12.8	1.5	14.0	0.4	7.7	0.0	5.5	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	8.6	12.8	1.5	14.0	0.4	7.7	0.0	5.5	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	348	1495	671	366	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.28	0.38	0.52	0.17	0.56	0.02	0.62	0.00	0.36	0.08	0.00	0.74
Avail Cap(c_a), veh/h	361	1495	671	395	1487	664	345	0	1017	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	15.1	16.3	11.9	17.1	13.2	23.2	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.4	0.7	2.8	0.2	1.5	0.1	3.4	0.0	0.5	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.9	3.3	4.9	0.6	5.5	0.1	3.3	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	15.8	19.1	12.1	18.7	13.2	26.6	0.0	25.4	26.8	0.0	36.0
LnGrp LOS	В	В	В	В	В	В	С	А	С	С	А	D
Approach Vol, veh/h		1008			909			358			219	
Approach Delay, s/veh		16.7			18.1			26.1			34.9	
Approach LOS		В			В			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	38.7	7.3	23.5	9.4	38.0	14.0	16.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	5.0	33.0	9.0	43.0				
Max Q Clear Time (g_c+I1), s	3.5	14.8	3.0	7.5	4.4	16.0	9.7	10.4				
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			20.2									
HCM 6th LOS			С									

5.9						
EBL	EBR	NBL	NBT	SBT	SBR	
Y		1	<b>^</b>	<b>**</b>		
10	52	201	0	702	52	
10	52	201	0	702	52	
0	0	2	0	0	2	
Stop	Stop	Free	Free	Free	Free	
-	None	-	None	-	None	
0	-	425	-	-	-	
,# 0	-	-	0	0	-	
0	-	-	0	0	-	
86	86	82	82	92	92	
0	6	4	0	9	23	
12	60	245	0	763	57	
	5.9 EBL 10 10 0 Stop - 0 ,# 0 0 86 0 12	5.9 EBL EBR 10 52 10 52 0 0 Stop Stop - None 0 - ,# 0 - 86 86 0 6 12 60	5.9   EBL EBR NBL   Y Y   10 52 201   10 52 201   10 52 201   0 0 2   Stop Stop Free   None -   0 - 425   ,# 0 - -   0 - - -   0 - - -   0 - - -   0 - - -   0 - - -   0 - - -   0 6 82 -   0 6 4 -   12 60 245 -	5.9   EBL EBR NBL NBT   Y Y Y   10 52 201 0   10 52 201 0   10 52 201 0   0 0 2 0   0 0 2 0   Stop Stop Free Free   None - None 0   0 - 425 -   # 0 - 0 0   0 - 0 0 0   86 86 82 82   0 6 4 0   12 60 245 0	5.9   EBL EBR NBL NBT SBT   Y Y Y Y Y Y   10 52 201 0 702   10 52 201 0 702   0 0 2 0 0   0 0 2 0 0   Stop Stop Free Free Free   None - None - -   0 - 425 - -   ,# 0 - 0 0 0   86 86 82 82 92   0 6 4 0 9   12 60 245 0 763	5.9   EBL EBR NBL NBT SBT SBR   Y Y Y Y Y SBT SBR   10 52 201 0 702 52   10 52 201 0 702 52   0 0 2 0 0 2   0 0 2 0 0 2   Stop Stop Free Free Free Free   None - None - None -   0 - 425 - - -   # 0 - 0 0 -   ## 0 - 0 0 -   ## 0 - 0 0 -   ## 0 - 0 0 -   ## 0 - 0 0 -   ## 0 6 4 0 9 23   10 60 245 0

Major/Minor	Minor2	Ν	/lajor1	Majo	or2		
Conflicting Flow All	1284	412	822	0	-	0	
Stage 1	794	-	-	-	-	-	
Stage 2	490	-	-	-	-	-	
Critical Hdwy	6.25	7.22	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.96	3.14	-	-	-	
Pot Cap-1 Maneuver	190	495	470	-	-	-	
Stage 1	335	-	-	-	-	-	
Stage 2	568	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	· 90	494	469	-	-	-	
Mov Cap-2 Maneuver	. 90	-	-	-	-	-	
Stage 1	160	-	-	-	-	-	
Stage 2	567	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	21.7	20.8	0	
HCM LOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	469	- 287	-	-
HCM Lane V/C Ratio	0.523	- 0.251	-	-
HCM Control Delay (s)	20.8	- 21.7	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	3	- 1	-	-

# Intersection

Movement E	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	17	6	6	31	16	77	8	218	76	49	334	27
Future Vol, veh/h	17	6	6	31	16	77	8	218	76	49	334	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control S	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	256	89	56	384	31

Major/Minor	Minor2			Minor1		I	Major1			Major2	2		
Conflicting Flow All	891	876	401	839	847	302	416	0	0	345	5 0	0	
Stage 1	513	513	-	319	319	-	-	-	-			-	
Stage 2	378	363	-	520	528	-	-	-	-			-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	- 1	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-			-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-		-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	i -	-	
Pot Cap-1 Maneuver	254	272	653	277	292	726	1154	-	-	1203	3 -	-	
Stage 1	528	512	-	678	642	-	-	-	-			-	
Stage 2	626	599	-	527	518	-	-	-	-			-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	196	253	652	252	271	725	1153	-	-	1203	3 -	-	
Mov Cap-2 Maneuver	196	253	-	252	271	-	-	-	-			-	
Stage 1	522	480	-	671	636	-	-	-	-			-	
Stage 2	519	593	-	480	486	-	-	-	-			-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	22.8	18.1	0.2	1	
HCM LOS	С	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1\	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1153	-	-	242	430	1203	-	-	
HCM Lane V/C Ratio	0.008	-	-	0.164	0.365	0.047	-	-	
HCM Control Delay (s)	8.1	0	-	22.8	18.1	8.1	0	-	
HCM Lane LOS	А	А	-	С	С	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	0.6	1.6	0.1	-	-	

	٠	-	7	*	-	*	1	t	1	4	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ţ,		7	ħ		۲	ħ		7	ħ	
Traffic Volume (veh/h)	89	294	32	25	423	25	72	260	49	75	223	69
Future Volume (veh/h)	89	294	32	25	423	25	72	260	49	75	223	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	327	36	29	498	29	87	313	59	86	256	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	252	566	62	359	603	35	344	481	91	311	442	136
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1642	181	1753	1750	102	1725	1494	282	1697	1371	423
Grp Volume(v), veh/h	99	0	363	29	0	527	87	0	372	86	0	335
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1753	0	1852	1725	0	1775	1697	0	1794
Q Serve(g_s), s	3.2	0.0	14.7	0.9	0.0	23.5	3.0	0.0	16.2	3.0	0.0	14.0
Cycle Q Clear(g_c), s	3.2	0.0	14.7	0.9	0.0	23.5	3.0	0.0	16.2	3.0	0.0	14.0
Prop In Lane	1.00		0.10	1.00		0.06	1.00		0.16	1.00		0.24
Lane Grp Cap(c), veh/h	252	0	628	359	0	638	344	0	572	311	0	578
V/C Ratio(X)	0.39	0.00	0.58	0.08	0.00	0.83	0.25	0.00	0.65	0.28	0.00	0.58
Avail Cap(c_a), veh/h	252	0	628	359	0	638	344	0	572	311	0	578
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.6	0.0	24.1	17.7	0.0	27.0	19.5	0.0	26.2	19.9	0.0	25.4
Incr Delay (d2), s/veh	4.5	0.0	3.9	0.4	0.0	11.7	1.8	0.0	5.6	2.2	0.0	4.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	6.7	0.4	0.0	11.8	1.3	0.0	7.4	1.3	0.0	6.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	25.1	0.0	28.0	18.1	0.0	38.7	21.3	0.0	31.8	22.1	0.0	29.6
LnGrp LOS	С	A	С	В	A	D	С	A	С	С	A	<u> </u>
Approach Vol, veh/h		462			556			459			421	
Approach Delay, s/veh		27.4			37.6			29.8			28.1	
Approach LOS		С			D			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0				
Max Q Clear Time (g_c+I1), s	5.0	18.2	2.9	16.7	5.0	16.0	5.2	25.5				
Green Ext Time (p_c), s	0.0	1.6	0.0	1.8	0.0	1.6	0.0	1.6				
Intersection Summary												
HCM 6th Ctrl Delay			31.1									
HCM 6th LOS			С									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	17	422	5	5	553	7	8	1	8	6	3	29
Future Vol, veh/h	17	422	5	5	553	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	480	6	6	651	8	15	2	15	8	4	40

Major/Minor I	Major1		Ν	/lajor2			Minor1		1	Minor2			
Conflicting Flow All	661	0	0	489	0	0	1213	1197	486	1199	1196	657	
Stage 1	-	-	-	-	-	-	524	524	-	669	669	-	
Stage 2	-	-	-	-	-	-	689	673	-	530	527	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	937	-	-	1085	-	-	160	187	585	164	188	468	
Stage 1	-	-	-	-	-	-	540	533	-	450	459	-	
Stage 2	-	-	-	-	-	-	439	457	-	536	532	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	935	-	-	1082	-	-	139	179	583	154	180	467	
Mov Cap-2 Maneuver	-	-	-	-	-	-	139	179	-	154	180	-	
Stage 1	-	-	-	-	-	-	523	516	-	437	454	-	
Stage 2	-	-	-	-	-	-	394	452	-	506	516	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.1			24			18.3			
HCM LOS							С			С			
Minor Lane/Major Mvm	nt I	VBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				

Minor Lane/Major Mvmt	NBLN1	ERL	ERI	EBK	WBL	<b>WRI</b>	<b>WRK</b>	SBLN1
Capacity (veh/h)	221	935	-	-	1082	-	-	323
HCM Lane V/C Ratio	0.145	0.021	-	-	0.005	-	-	0.161
HCM Control Delay (s)	24	8.9	0	-	8.3	0	-	18.3
HCM Lane LOS	С	А	А	-	А	А	-	С
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.6

2027 PM - Without Project 04/19/2022

	٠	-	7	1	-	*	1	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	<b>††</b>	1	٢	<b>^</b>	1	٢	¢Î,		٢	ħ	
Traffic Volume (veh/h)	96	612	414	64	644	9	276	54	45	21	70	97
Future Volume (veh/h)	96	612	414	64	644	9	276	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	651	440	70	700	10	317	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	357	1384	608	306	1373	611	435	278	233	342	115	158
Arrive On Green	0.05	0.39	0.39	0.05	0.38	0.38	0.16	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	651	440	70	700	10	317	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.8	11.3	19.7	1.9	12.3	0.3	11.5	0.0	4.1	1.0	0.0	9.7
Cycle Q Clear(g_c), s	2.8	11.3	19.7	1.9	12.3	0.3	11.5	0.0	4.1	1.0	0.0	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	357	1384	608	306	1373	611	435	0	512	342	0	273
V/C Ratio(X)	0.29	0.47	0.72	0.23	0.51	0.02	0.73	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	433	1384	608	349	1373	611	465	0	980	402	0	767
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.1	19.0	21.6	14.9	19.7	16.0	22.5	0.0	21.9	27.8	0.0	33.3
Incr Delay (d2), s/veh	0.4	1.1	7.3	0.4	1.4	0.0	5.3	0.0	0.2	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.1	4.6	8.2	0.8	5.1	0.1	5.2	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.5	20.2	29.0	15.2	21.1	16.0	27.8	0.0	22.2	27.9	0.0	37.8
LnGrp LOS	В	С	С	В	С	В	С	Α	С	С	Α	D
Approach Vol, veh/h		1193			780			431			235	
Approach Delay, s/veh		23.0			20.5			26.3			36.7	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	29.5	9.5	36.5	18.6	18.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	15.0	37.0				
Max Q Clear Time (g_c+I1), s	3.9	21.7	3.0	6.1	4.8	14.3	13.5	11.7				
Green Ext Time (p_c), s	0.0	4.3	0.0	0.7	0.1	4.2	0.2	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			24.0									
HCM 6th LOS			С									

Int Delay, s/veh	4.6							
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	Y		1	- 44	<b>**i</b>			
Traffic Vol, veh/h	8	109	129	0	931	39		
Future Vol, veh/h	8	109	129	0	931	39		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Stop	Stop	Free	Free	Free	Free		
RT Channelized	-	None	-	None	-	None		
Storage Length	0	-	425	-	-	-		
Veh in Median Storage	e, # 0	-	-	0	0	-		
Grade, %	0	-	-	0	0	-		
Peak Hour Factor	81	81	92	92	90	90		
Heavy Vehicles, %	0	3	4	3	3	0		
Mvmt Flow	10	135	140	0	1034	43		

Major/Minor	Minor2	N	Major1	Ма	jor2	
Conflicting Flow All	1336	539	1077	0	-	0
Stage 1	1056	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	177	415	354	-	-	-
Stage 1	232	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	· 107	415	354	-	-	-
Mov Cap-2 Maneuver	· 107	-	-	-	-	-
Stage 1	140	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Approach	EB		NB		SB	

Approach	EB	NB	SB
HCM Control Delay, s	22.6	21.7	0
HCM LOS	С		

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR	
Capacity (veh/h)	354	- 347	-	-	
HCM Lane V/C Ratio	0.396	- 0.416	-	-	
HCM Control Delay (s)	21.7	- 22.6	-	-	
HCM Lane LOS	С	- C	-	-	
HCM 95th %tile Q(veh)	1.8	- 2	-	-	

### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	9	13	39	17	77	6	274	67	76	386	30
Future Vol, veh/h	18	9	13	39	17	77	6	274	67	76	386	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	291	71	82	415	32

Major/Minor	Minor2		Ν	1inor1		I	Major1		Ν	/lajor2			
Conflicting Flow All	993	971	433	949	952	329	449	0	0	362	0	0	
Stage 1	597	597	-	339	339	-	-	-	-	-	-	-	
Stage 2	396	374	-	610	613	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	226	255	627	242	255	717	1122	-	-	1208	-	-	
Stage 1	493	495	-	680	633	-	-	-	-	-	-	-	
Stage 2	633	621	-	485	477	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	· 170	230	626	210	230	716	1120	-	-	1208	-	-	
Mov Cap-2 Maneuver	· 170	230	-	210	230	-	-	-	-	-	-	-	
Stage 1	489	449	-	675	629	-	-	-	-	-	-	-	
Stage 2	531	617	-	418	433	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	24	22.3	0.1	1.3	
HCM LOS	С	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR I	EBLn1\	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1120	-	-	241	362	1208	-	-	
HCM Lane V/C Ratio	0.006	-	-	0.216	0.432	0.068	-	-	
HCM Control Delay (s)	8.2	0	-	24	22.3	8.2	0	-	
HCM Lane LOS	А	А	-	С	С	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	0.8	2.1	0.2	-	-	

	٠	-	7	*	•	*	1	t	1	1	ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		7	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	106	420	61	95	365	39	46	228	48	93	283	90
Future Volume (veh/h)	106	420	61	95	365	39	46	228	48	93	283	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	442	64	100	384	41	50	248	52	98	298	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	532	77	250	562	60	331	499	105	398	460	147
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1795	1596	231	1795	1687	180	1810	1498	314	1795	1380	440
Grp Volume(v), veh/h	112	0	506	100	0	425	50	0	300	98	0	393
Grp Sat Flow(s),veh/h/ln	1795	0	1828	1795	0	1867	1810	0	1813	1795	0	1819
Q Serve(g_s), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	11.9	3.2	0.0	16.5
Cycle Q Clear(g_c), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	11.9	3.2	0.0	16.5
Prop In Lane	1.00		0.13	1.00		0.10	1.00		0.17	1.00		0.24
Lane Grp Cap(c), veh/h	312	0	609	250	0	622	331	0	604	398	0	606
V/C Ratio(X)	0.36	0.00	0.83	0.40	0.00	0.68	0.15	0.00	0.50	0.25	0.00	0.65
Avail Cap(c_a), veh/h	312	0	609	250	0	622	331	0	604	398	0	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	27.7	21.1	0.0	25.9	18.9	0.0	24.0	18.6	0.0	25.5
Incr Delay (d2), s/veh	3.2	0.0	12.5	4.7	0.0	6.0	1.0	0.0	2.9	1.5	0.0	5.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.7	0.0	11.6	1.6	0.0	8.5	0.7	0.0	5.4	1.4	0.0	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.1	0.0	40.1	25.8	0.0	31.9	19.8	0.0	26.9	20.1	0.0	30.8
LnGrp LOS	С	А	D	С	А	С	В	А	С	С	А	С
Approach Vol, veh/h		618			525			350			491	
Approach Delay, s/veh		37.0			30.7			25.9			28.7	
Approach LOS		D			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0				
Max Q Clear Time (g_c+I1), s	5.2	13.9	5.2	25.0	3.6	18.5	5.7	19.7				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.4	0.0	1.8	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			31.3									
HCM 6th LOS			С									

# Intersection

Mayramaant		ГРТ						NDT			ODT	000
Movement	EBL	ERI	EBK	<b>WBL</b>	<b>WRI</b>	WBR	NBL	INR I	NBK	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	18	573	16	4	500	9	1	4	14	0	2	41
Future Vol, veh/h	18	573	16	4	500	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, a	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	597	17	4	515	9	1	6	21	0	3	57

Major/Minor	Major1		М	ajor2		Ν	/linor1		ľ	Minor2			
Conflicting Flow All	526	0	0	615	0	0	1203	1179	607	1187	1183	522	
Stage 1	-	-	-	-	-	-	645	645	-	530	530	-	
Stage 2	-	-	-	-	-	-	558	534	-	657	653	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	1051	-	-	974	-	-	163	192	487	167	191	549	
Stage 1	-	-	-	-	-	-	464	471	-	536	530	-	
Stage 2	-	-	-	-	-	-	518	528	-	457	467	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1049	-	-	973	-	-	141	185	487	152	184	548	
Mov Cap-2 Maneuver	-	-	-	-	-	-	141	185	-	152	184	-	
Stage 1	-	-	-	-	-	-	451	457	-	520	526	-	
Stage 2	-	-	-	-	-	-	459	524	-	420	453	-	
Annroach	FB			WR			NB			SB			
HCM Control Delay	0.3			0.1			16.0			13.1			
HCM LOS	0.5			0.1			10.9 C			IJ.I R			
							U			G			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR \$	SBLn1
Capacity (veh/h)	331	1049	-	-	973	-	-	502
HCM Lane V/C Ratio	0.084	0.018	-	-	0.004	-	-	0.119
HCM Control Delay (s)	16.9	8.5	0	-	8.7	0	-	13.1
HCM Lane LOS	С	А	А	-	А	А	-	В
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

2032 AM - Without Project 04/19/2022

	٠	-	7	*	-	*	1	1	1	1	Ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>^</b>	1	7	ţ,		7	ħ	
Traffic Volume (veh/h)	88	533	329	57	817	12	207	61	68	26	70	108
Future Volume (veh/h)	88	533	329	57	817	12	207	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	599	370	62	888	13	230	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	331	1495	671	351	1487	664	345	190	212	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	599	370	62	888	13	230	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.4	9.3	13.9	1.5	15.2	0.4	8.4	0.0	5.5	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	9.3	13.9	1.5	15.2	0.4	8.4	0.0	5.5	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	331	1495	671	351	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.30	0.40	0.55	0.18	0.60	0.02	0.67	0.00	0.36	0.08	0.00	0.74
Avail Cap(c_a), veh/h	344	1495	671	402	1487	664	345	0	1017	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.0	15.3	16.6	12.0	17.5	13.2	23.5	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.5	0.8	3.2	0.2	1.8	0.1	4.9	0.0	0.5	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.9	3.5	5.3	0.6	6.0	0.1	3.7	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.6	16.1	19.9	12.2	19.3	13.2	28.3	0.0	25.4	26.8	0.0	36.0
LnGrp LOS	В	В	В	В	В	В	С	Α	С	С	Α	D
Approach Vol, veh/h		1068			963			374			219	
Approach Delay, s/veh		17.2			18.7			27.2			34.9	
Approach LOS		В			В			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	38.7	7.3	23.5	9.4	38.0	14.0	16.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	9.0	43.0				
Max Q Clear Time (g_c+I1), s	3.5	15.9	3.0	7.5	4.4	17.2	10.4	10.4				
Green Ext Time (p_c), s	0.0	4.9	0.0	0.9	0.0	5.5	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			20.6									
HCM 6th LOS			С									

6.1						
EBL	EBR	NBL	NBT	SBT	SBR	
Y		5	<b>^</b>	<b>**i</b>		
10	52	201	0	748	52	
10	52	201	0	748	52	
0	0	2	0	0	2	
Stop	Stop	Free	Free	Free	Free	
-	None	-	None	-	None	
0	-	425	-	-	-	
,# 0	-	-	0	0	-	
0	-	-	0	0	-	
86	86	82	82	92	92	
0	6	4	0	9	23	
12	60	245	0	813	57	
	6.1 EBL 10 10 0 Stop - 0 ,# 0 0 86 0 12	6.1 EBL EBR ↓ 10 52 10 52 0 0 Stop Stop - None 0 - ,# 0 - 0 - 86 86 0 6 12 60	6.1   EBL EBR NBL   Y Y   10 52 201   10 52 201   10 52 201   0 0 2   Stop Stop Free   None -   0 - 425   ,# 0 - -   86 86 82   0 6 4   12 60 245	6.1   EBL EBR NBL NBT   Y Y Y   10 52 201 0   10 52 201 0   10 52 201 0   0 0 2 0   Stop Stop Free Free   None - None   0 - 425 -   ,# 0 - 0   86 86 82 82   0 6 4 0   12 60 245 0	6.1   EBL EBR NBL NBT SBT   Y Y Y Y Y Y   10 52 201 0 748   10 52 201 0 748   0 0 2 0 0   Stop Stop Free Free Free   None - None -   0 - 425 - -   ,# 0 - 0 0   86 86 82 82 92   0 6 4 0 9   12 60 245 0 813	6.1   EBL EBR NBL NBT SBT SBR   Y

Major/Minor	Minor2	Ν	/lajor1	Maj	jor2	
Conflicting Flow All	1334	437	872	0	-	0
Stage 1	844	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	178	477	445	-	-	-
Stage 1	312	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	· 79	476	444	-	-	-
Mov Cap-2 Maneuver	· 79	-	-	-	-	-
Stage 1	139	-	-	-	-	-
Stage 2	567	-	-	-	-	-
					-	

Approach	EB	NB	SB	
HCM Control Delay, s	23.8	22.7	0	
HCMLOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	444	- 263	-	-
HCM Lane V/C Ratio	0.552	- 0.274	-	-
HCM Control Delay (s)	22.6	- 23.8	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	3.3	- 1.1	-	-

# Intersection

Movement E	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			4			4			4	
Traffic Vol, veh/h	17	6	6	31	16	77	8	232	76	49	354	27
Future Vol, veh/h	17	6	6	31	16	77	8	232	76	49	354	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control S	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	273	89	56	407	31

Major/Minor	Minor2			Minor1		M	Major1			Major2			
Conflicting Flow All	931	916	424	879	887	319	439	0	0	362	0	0	
Stage 1	536	536	-	336	336	-	-	-	-	-	-	-	
Stage 2	395	380	-	543	551	-	-	-	-	-	-	-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-	
Pot Cap-1 Maneuver	238	257	634	261	277	710	1132	-	-	1186	-	-	
Stage 1	513	500	-	664	631	-	-	-	-	-	-	-	
Stage 2	613	588	-	511	506	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	182	238	633	237	257	709	1131	-	-	1186	-	-	
Mov Cap-2 Maneuver	182	238	-	237	257	-	-	-	-	-	-	-	
Stage 1	507	468	-	657	625	-	-	-	-	-	-	-	
Stage 2	506	582	-	464	474	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	24.3	19.1	0.2	0.9	
HCM LOS	С	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1131	-	-	226	411	1186	-	-	
HCM Lane V/C Ratio	0.008	-	-	0.176	0.382	0.047	-	-	
HCM Control Delay (s)	8.2	0	-	24.3	19.1	8.2	0	-	
HCM Lane LOS	А	А	-	С	С	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	0.6	1.8	0.1	-	-	

	٠	-	7	*	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		7	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	89	321	32	25	450	25	72	277	49	75	243	69
Future Volume (veh/h)	89	321	32	25	450	25	72	277	49	75	243	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	357	36	29	529	29	87	334	59	86	279	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	232	571	58	338	605	33	328	487	86	297	452	128
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1658	167	1753	1757	96	1725	1511	267	1697	1402	397
Grp Volume(v), veh/h	99	0	393	29	0	558	87	0	393	86	0	358
Grp Sat Flow(s),veh/h/ln	1781	0	1825	1753	0	1853	1725	0	1778	1697	0	1799
Q Serve(g_s), s	3.2	0.0	16.2	0.9	0.0	25.4	3.0	0.0	17.3	3.0	0.0	15.2
Cycle Q Clear(g_c), s	3.2	0.0	16.2	0.9	0.0	25.4	3.0	0.0	17.3	3.0	0.0	15.2
Prop In Lane	1.00		0.09	1.00		0.05	1.00		0.15	1.00		0.22
Lane Grp Cap(c), veh/h	232	0	629	338	0	638	328	0	573	297	0	580
V/C Ratio(X)	0.43	0.00	0.63	0.09	0.00	0.87	0.27	0.00	0.69	0.29	0.00	0.62
Avail Cap(c_a), veh/h	232	0	629	338	0	638	328	0	573	297	0	580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	24.6	18.0	0.0	27.7	19.7	0.0	26.5	20.2	0.0	25.8
Incr Delay (d2), s/veh	5.7	0.0	4.6	0.5	0.0	15.4	2.0	0.0	6.6	2.5	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.6	0.0	7.5	0.4	0.0	13.3	1.3	0.0	8.0	1.3	0.0	7.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.9	0.0	29.3	18.5	0.0	43.1	21.7	0.0	33.1	22.6	0.0	30.7
LnGrp LOS	С	Α	С	В	Α	D	С	Α	С	С	Α	<u> </u>
Approach Vol, veh/h		492			587			480			444	
Approach Delay, s/veh		28.8			41.9			31.0			29.1	
Approach LOS		С			D			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0				
Max Q Clear Time (g_c+I1), s	5.0	19.3	2.9	18.2	5.0	17.2	5.2	27.4				
Green Ext Time (p_c), s	0.0	1.6	0.0	1.9	0.0	1.6	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			33.2									
HCM 6th LOS			С									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	17	449	5	5	580	7	8	1	8	6	3	29
Future Vol, veh/h	17	449	5	5	580	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	510	6	6	682	8	15	2	15	8	4	40

Major/Minor	Major1		M	ajor2		Ν	/linor1		Ν	Minor2			
Conflicting Flow All	692	0	0	519	0	0	1274	1258	516	1260	1257	688	
Stage 1	-	-	-	-	-	-	554	554	-	700	700	-	
Stage 2	-	-	-	-	-	-	720	704	-	560	557	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	912	-	-	1057	-	-	145	172	563	149	173	450	
Stage 1	-	-	-	-	-	-	520	517	-	433	444	-	
Stage 2	-	-	-	-	-	-	422	443	-	516	515	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	910	-	-	1054	-	-	126	165	561	139	166	449	
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	165	-	139	166	-	
Stage 1	-	-	-	-	-	-	503	500	-	420	439	-	
Stage 2	-	-	-	-	-	-	378	438	-	486	499	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.1			26			19.4			
HCM LOS							D			С			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR \$	SBLn1	
Capacity (veh/h)	203	910	-	-	1054	-	-	302	
HCM Lane V/C Ratio	0.158	0.021	-	-	0.006	-	-	0.172	
HCM Control Delay (s)	26	9	0	-	8.4	0	-	19.4	
HCM Lane LOS	D	А	А	-	А	А	-	С	
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.6	

2032 PM - Without Project 04/19/2022

	٠	-	7	-	-	*	1	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	ţ,		7	ħ	
Traffic Volume (veh/h)	96	652	441	64	687	9	289	54	45	21	70	97
Future Volume (veh/h)	96	652	441	64	687	9	289	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	694	469	70	747	10	332	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	335	1370	601	288	1358	604	447	285	239	340	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.38	0.38	0.17	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	694	469	70	747	10	332	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	2.9	12.4	22.0	1.9	13.6	0.3	12.1	0.0	4.1	1.0	0.0	9.8
Cycle Q Clear(g_c), s	2.9	12.4	22.0	1.9	13.6	0.3	12.1	0.0	4.1	1.0	0.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	335	1370	601	288	1358	604	447	0	524	340	0	272
V/C Ratio(X)	0.30	0.51	0.78	0.24	0.55	0.02	0.74	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	388	1370	601	330	1358	604	503	0	970	399	0	718
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	19.8	22.8	15.4	20.5	16.4	22.5	0.0	21.7	28.2	0.0	33.8
Incr Delay (d2), s/veh	0.5	1.3	9.7	0.4	1.6	0.1	5.2	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.1	5.1	9.4	0.8	5.7	0.1	5.5	0.0	1.6	0.4	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	21.1	32.4	15.9	22.1	16.4	27.6	0.0	21.9	28.3	0.0	38.3
LnGrp LOS	В	С	С	В	С	В	С	Α	С	С	Α	D
Approach Vol, veh/h		1265			827			446			235	
Approach Delay, s/veh		24.9			21.5			26.2			37.2	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.4	9.5	36.5	19.4	18.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	7.0	31.0	17.0	35.0				
Max Q Clear Time (g_c+I1), s	3.9	24.0	3.0	6.1	4.9	15.6	14.1	11.8				
Green Ext Time (p_c), s	0.0	3.9	0.0	0.7	0.0	4.5	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			25.2									
HCM 6th LOS			С									

Int Delay, s/veh	4.9							
Movement	EBL	EBR	NBL	NBT	SBT	SBR		
Lane Configurations	Y		1	<b>^</b>	<b>**i</b>			
Traffic Vol, veh/h	8	109	129	0	992	39		
Future Vol, veh/h	8	109	129	0	992	39		
Conflicting Peds, #/hr	0	0	0	0	0	0		
Sign Control	Stop	Stop	Free	Free	Free	Free		
RT Channelized	-	None	-	None	-	None		
Storage Length	0	-	425	-	-	-		
Veh in Median Storage	e, # 0	-	-	0	0	-		
Grade, %	0	-	-	0	0	-		
Peak Hour Factor	81	81	92	92	90	90		
Heavy Vehicles, %	0	3	4	3	3	0		
Mvmt Flow	10	135	140	0	1102	43		

Major/Minor	Minor2	N	Major1	Majo	or2		
Conflicting Flow All	1404	573	1145	0	-	0	
Stage 1	1124	-	-	-	-	-	
Stage 2	280	-	-	-	-	-	
Critical Hdwy	6.25	7.16	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.93	3.14	-	-	-	
Pot Cap-1 Maneuver	162	394	327	-	-	-	
Stage 1	211	-	-	-	-	-	
Stage 2	722	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	- 93	394	327	-	-	-	
Mov Cap-2 Maneuver	- 93	-	-	-	-	-	
Stage 1	121	-	-	-	-	-	
Stage 2	722	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	24.9	24	0	
HCM LOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	327	- 323	-	-
HCM Lane V/C Ratio	0.429	- 0.447	-	-
HCM Control Delay (s)	24	- 24.9	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	2.1	- 2.2	-	-

5

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	9	13	39	17	77	6	287	67	76	413	30
Future Vol, veh/h	18	9	13	39	17	77	6	287	67	76	413	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	305	71	82	444	32

Major/Minor	Minor2		Ν	1inor1		ſ	Major1		Ν	/lajor2			
Conflicting Flow All	1036	1014	462	992	995	343	478	0	0	376	0	0	
Stage 1	626	626	-	353	353	-	-	-	-	-	-	-	
Stage 2	410	388	-	639	642	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	212	240	604	227	241	704	1095	-	-	1194	-	-	
Stage 1	475	480	-	668	624	-	-	-	-	-	-	-	
Stage 2	623	612	-	468	463	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	158	216	603	195	216	703	1093	-	-	1194	-	-	
Mov Cap-2 Maneuver	158	216	-	195	216	-	-	-	-	-	-	-	
Stage 1	471	434	-	663	620	-	-	-	-	-	-	-	
Stage 2	521	608	-	401	419	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	25.6	24	0.1	1.2	
HCM LOS	D	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR E	BLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1093	-	-	226	343	1194	-	-
HCM Lane V/C Ratio	0.006	-	-	0.23	0.456	0.068	-	-
HCM Control Delay (s)	8.3	0	-	25.6	24	8.2	0	-
HCM Lane LOS	А	А	-	D	С	А	А	-
HCM 95th %tile Q(veh)	0	-	-	0.9	2.3	0.2	-	-

	٠	-	7	*	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		7	ţ,		٦	ţ,		7	ţ,	
Traffic Volume (veh/h)	106	457	61	95	389	39	46	243	48	93	310	90
Future Volume (veh/h)	106	457	61	95	389	39	46	243	48	93	310	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	481	64	100	409	41	50	264	52	98	326	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	309	556	74	237	585	59	297	489	96	372	455	133
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1795	1616	215	1795	1698	170	1810	1517	299	1795	1413	412
Grp Volume(v), veh/h	112	0	545	100	0	450	50	0	316	98	0	421
Grp Sat Flow(s),veh/h/ln	1795	0	1831	1795	0	1868	1810	0	1815	1795	0	1824
Q Serve(g_s), s	3.6	0.0	25.0	3.2	0.0	18.7	1.6	0.0	12.9	3.2	0.0	18.3
Cycle Q Clear(g_c), s	3.6	0.0	25.0	3.2	0.0	18.7	1.6	0.0	12.9	3.2	0.0	18.3
Prop In Lane	1.00		0.12	1.00		0.09	1.00		0.16	1.00		0.23
Lane Grp Cap(c), veh/h	309	0	631	237	0	644	297	0	585	372	0	588
V/C Ratio(X)	0.36	0.00	0.86	0.42	0.00	0.70	0.17	0.00	0.54	0.26	0.00	0.72
Avail Cap(c_a), veh/h	309	0	631	237	0	644	297	0	585	372	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	27.5	21.1	0.0	25.5	19.9	0.0	25.0	19.4	0.0	26.9
Incr Delay (d2), s/veh	3.3	0.0	14.7	5.4	0.0	6.2	1.2	0.0	3.6	1.7	0.0	7.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	12.9	1.6	0.0	9.0	0.7	0.0	5.9	1.5	0.0	8.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.8	0.0	42.2	26.5	0.0	31.7	21.1	0.0	28.6	21.2	0.0	34.2
LnGrp LOS	С	<u>A</u>	D	C	<u>A</u>	C	С	A	C	C	A	<u> </u>
Approach Vol, veh/h		657			550			366			519	
Approach Delay, s/veh		38.9			30.7			27.6			31.7	
Approach LOS		D			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0				
Max Q Clear Time (g_c+I1), s	5.2	14.9	5.2	27.0	3.6	20.3	5.6	20.7				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.3	0.0	1.7	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			33.0									
HCM 6th LOS			С									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	610	16	4	524	9	1	4	14	0	2	41
Future Vol, veh/h	18	610	16	4	524	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	635	17	4	540	9	1	6	21	0	3	57

Major/Minor	Major1		М	ajor2		Ν	/linor1		ľ	Minor2			
Conflicting Flow All	551	0	0	653	0	0	1266	1242	645	1250	1246	547	
Stage 1	-	-	-	-	-	-	683	683	-	555	555	-	
Stage 2	-	-	-	-	-	-	583	559	-	695	691	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	1029	-	-	943	-	-	147	176	463	151	175	531	
Stage 1	-	-	-	-	-	-	442	452	-	520	516	-	
Stage 2	-	-	-	-	-	-	502	514	-	436	449	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1027	-	-	942	-	-	126	169	463	137	168	530	
Mov Cap-2 Maneuver	-	-	-	-	-	-	126	169	-	137	168	-	
Stage 1	-	-	-	-	-	-	429	438	-	504	512	-	
Stage 2	-	-	-	-	-	-	443	510	-	399	436	-	
Approach	FB			WB			NB			SB			
HCM Control Delay s	0.2			0.1			17.9			13.5			
HCM LOS	0.2			0.1			С.			. U.U			
							J			5			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	307	1027	-	-	942	-	-	482
HCM Lane V/C Ratio	0.091	0.018	-	-	0.004	-	-	0.124
HCM Control Delay (s)	17.9	8.6	0	-	8.8	0	-	13.5
HCM Lane LOS	С	А	А	-	А	А	-	В
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4

2042 AM - Without Project 04/19/2022

	٠	-	7	*	-	*	1	1	1	1	Ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	ţ,		7	ħ	
Traffic Volume (veh/h)	88	606	374	57	928	12	239	61	68	26	70	108
Future Volume (veh/h)	88	606	374	57	928	12	239	61	68	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	681	420	62	1009	13	266	68	76	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	276	1434	644	304	1427	637	393	213	238	329	99	154
Arrive On Green	0.05	0.41	0.41	0.05	0.40	0.40	0.15	0.27	0.27	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	800	894	1810	666	1031
Grp Volume(v), veh/h	99	681	420	62	1009	13	266	0	144	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1693	1810	0	1697
Q Serve(g_s), s	2.6	11.7	17.7	1.7	19.5	0.4	9.9	0.0	5.6	1.1	0.0	8.8
Cycle Q Clear(g_c), s	2.6	11.7	17.7	1.7	19.5	0.4	9.9	0.0	5.6	1.1	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.53	1.00		0.61
Lane Grp Cap(c), veh/h	276	1434	644	304	1427	637	393	0	451	329	0	253
V/C Ratio(X)	0.36	0.47	0.65	0.20	0.71	0.02	0.68	0.00	0.32	0.09	0.00	0.75
Avail Cap(c_a), veh/h	288	1434	644	351	1427	637	395	0	976	387	0	833
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.4	17.5	19.2	13.6	20.2	14.6	23.2	0.0	24.0	28.0	0.0	33.3
Incr Delay (d2), s/veh	0.8	1.1	5.1	0.3	3.0	0.1	4.6	0.0	0.4	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	4.5	7.0	0.6	7.9	0.2	4.3	0.0	2.2	0.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.2	18.6	24.3	13.9	23.2	14.6	27.7	0.0	24.4	28.1	0.0	37.8
LnGrp LOS	В	В	С	В	С	В	С	Α	С	С	Α	D
Approach Vol, veh/h		1200			1084			410			219	
Approach Delay, s/veh		20.4			22.6			26.6			36.5	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	38.7	7.3	26.7	9.5	38.0	16.9	17.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	12.0	40.0				
Max Q Clear Time (g_c+I1), s	3.7	19.7	3.1	7.6	4.6	21.5	11.9	10.8				
Green Ext Time (p_c), s	0.0	4.9	0.0	0.9	0.0	5.3	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			23.3									
HCM 6th LOS			С									

Int Delay, s/veh	7.1						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		٦	- 11	<b>**i</b>		
Traffic Vol, veh/h	10	52	201	0	849	52	
Future Vol, veh/h	10	52	201	0	849	52	
Conflicting Peds, #/hr	0	0	2	0	0	2	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	425	-	-	-	
Veh in Median Storage	,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	86	86	82	82	92	92	
Heavy Vehicles, %	0	6	4	0	9	23	
Mvmt Flow	12	60	245	0	923	57	

Major/Minor	Minor2	Ν	/lajor1	Ma	ijor2	
Conflicting Flow All	1444	492	982	0	-	0
Stage 1	954	-	-	-	-	-
Stage 2	490	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	153	439	393	-	-	-
Stage 1	268	-	-	-	-	-
Stage 2	568	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	57	438	392	-	-	-
Mov Cap-2 Maneuver	· 57	-	-	-	-	-
Stage 1	100	-	-	-	-	-
Stage 2	567	-	-	-	-	-
					0.5	

Approach	EB	NB	SB	
HCM Control Delay, s	30.7	28.3	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	392	- 211	-	-
HCM Lane V/C Ratio	0.625	- 0.342	-	-
HCM Control Delay (s)	28.3	- 30.7	-	-
HCM Lane LOS	D	- D	-	-
HCM 95th %tile Q(veh)	4.1	- 1.4	-	-

# Intersection

Movement E	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			4			4			4	
Traffic Vol, veh/h	17	6	6	31	16	77	8	264	76	49	399	27
Future Vol, veh/h	17	6	6	31	16	77	8	264	76	49	399	27
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control S	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	23	8	8	39	20	97	9	311	89	56	459	31

Major/Minor	Minor2			Minor1		I	Major1			Major2			
Conflicting Flow All	1021	1006	476	969	977	357	491	0	0	400	0	0	
Stage 1	588	588	-	374	374	-	-	-	-	-	-	-	
Stage 2	433	418	-	595	603	-	-	-	-	-	-	-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-	
Pot Cap-1 Maneuver	207	227	593	226	245	676	1083	-	-	1148	-	-	
Stage 1	480	473	-	633	607	-	-	-	-	-	-	-	
Stage 2	584	566	-	479	479	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	155	209	592	203	226	675	1082	-	-	1148	-	-	
Mov Cap-2 Maneuver	155	209	-	203	226	-	-	-	-	-	-	-	
Stage 1	474	441	-	626	600	-	-	-	-	-	-	-	
Stage 2	477	560	-	432	446	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	28.1	21.9	0.2	0.9	
HCM LOS	D	С			

Minor Lane/Major Mvmt	NBL	NBT	NBR I	EBLn1V	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1082	-	-	195	367	1148	-	-	
HCM Lane V/C Ratio	0.009	-	-	0.204	0.428	0.049	-	-	
HCM Control Delay (s)	8.4	0	-	28.1	21.9	8.3	0	-	
HCM Lane LOS	А	А	-	D	С	А	А	-	
HCM 95th %tile Q(veh)	0	-	-	0.7	2.1	0.2	-	-	

	٠	-	7	*	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		7	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Future Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	424	36	29	601	29	87	378	59	86	331	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	198	600	51	305	629	30	279	480	75	253	454	108
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1686	143	1753	1769	85	1725	1542	241	1697	1459	348
Grp Volume(v), veh/h	99	0	460	29	0	630	87	0	437	86	0	410
Grp Sat Flow(s),veh/h/ln	1781	0	1830	1753	0	1855	1725	0	1783	1697	0	1808
Q Serve(g_s), s	3.1	0.0	19.5	0.9	0.0	29.8	3.0	0.0	20.1	3.0	0.0	18.2
Cycle Q Clear(g_c), s	3.1	0.0	19.5	0.9	0.0	29.8	3.0	0.0	20.1	3.0	0.0	18.2
Prop In Lane	1.00		0.08	1.00		0.05	1.00		0.14	1.00		0.19
Lane Grp Cap(c), veh/h	198	0	650	305	0	660	279	0	555	253	0	562
V/C Ratio(X)	0.50	0.00	0.71	0.10	0.00	0.96	0.31	0.00	0.79	0.34	0.00	0.73
Avail Cap(c_a), veh/h	198	0	650	305	0	660	279	0	555	253	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	25.0	18.0	0.0	28.3	21.0	0.0	28.3	21.5	0.0	27.6
Incr Delay (d2), s/veh	8.7	0.0	6.4	0.6	0.0	25.6	2.9	0.0	10.8	3.6	0.0	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.7	0.0	9.1	0.4	0.0	17.1	1.4	0.0	9.8	1.4	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.7	0.0	31.3	18.7	0.0	53.9	23.9	0.0	39.1	25.1	0.0	35.7
LnGrp LOS	С	А	С	В	Α	D	С	Α	D	С	Α	D
Approach Vol, veh/h		559			659			524			496	
Approach Delay, s/veh		31.2			52.4			36.6			33.9	
Approach LOS		С			D			D			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max Q Clear Time (g_c+l1), s	5.0	22.1	2.9	21.5	5.0	20.2	5.1	31.8				
Green Ext Time (p_c), s	0.0	1.3	0.0	2.0	0.0	1.5	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			39.3									
HCM 6th LOS			D									

# Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	17	510	5	5	641	7	8	1	8	6	3	29
Future Vol, veh/h	17	510	5	5	641	7	8	1	8	6	3	29
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage	, # -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	19	580	6	6	754	8	15	2	15	8	4	40

Major/Minor	Major1		М	ajor2		ľ	Minor1		N	Minor2			
Conflicting Flow All	764	0	0	589	0	0	1416	1400	586	1402	1399	760	
Stage 1	-	-	-	-	-	-	624	624	-	772	772	-	
Stage 2	-	-	-	-	-	-	792	776	-	630	627	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	858	-	-	996	-	-	116	142	514	119	142	409	
Stage 1	-	-	-	-	-	-	477	481	-	395	412	-	
Stage 2	-	-	-	-	-	-	385	410	-	473	479	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	856	-	-	993	-	-	99	135	513	110	135	408	
Mov Cap-2 Maneuver	-	-	-	-	-	-	99	135	-	110	135	-	
Stage 1	-	-	-	-	-	-	460	464	-	381	407	-	
Stage 2	-	-	-	-	-	-	341	405	-	442	462	-	
Approach	EB			WB			NB			SB			

HCM Control Delay, s	0.3	0.1	32.2	22.5	
HCM LOS			D	С	

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	164	856	-	-	993	-	-	257
HCM Lane V/C Ratio	0.196	0.023	-	-	0.006	-	-	0.203
HCM Control Delay (s)	32.2	9.3	0	-	8.6	0	-	22.5
HCM Lane LOS	D	А	А	-	А	А	-	С
HCM 95th %tile Q(veh)	0.7	0.1	-	-	0	-	-	0.7

2042 PM - Without Project 04/19/2022

	٠	-	7	1	-	*	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	۲	<b>^</b>	1	٦	<b>^</b>	1	٦	ħ		٦	Þ	
Traffic Volume (veh/h)	96	741	501	64	780	9	317	54	45	21	70	97
Future Volume (veh/h)	96	741	501	64	780	9	317	54	45	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	788	533	70	848	10	364	62	52	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	296	1360	597	254	1350	600	468	297	249	334	113	155
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.19	0.32	0.32	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	939	788	1810	723	994
Grp Volume(v), veh/h	102	788	533	70	848	10	364	0	114	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1727	1810	0	1717
Q Serve(g_s), s	3.0	15.2	27.6	2.0	16.7	0.3	13.9	0.0	4.2	1.0	0.0	10.2
Cycle Q Clear(g_c), s	3.0	15.2	27.6	2.0	16.7	0.3	13.9	0.0	4.2	1.0	0.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	296	1360	597	254	1350	600	468	0	546	334	0	268
V/C Ratio(X)	0.35	0.58	0.89	0.28	0.63	0.02	0.78	0.00	0.21	0.08	0.00	0.78
Avail Cap(c_a), veh/h	325	1360	597	273	1350	600	525	0	934	389	0	652
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.0	21.4	25.3	16.7	22.3	17.1	23.0	0.0	21.7	29.4	0.0	35.2
Incr Delay (d2), s/veh	0.7	1.8	18.2	0.6	2.2	0.1	6.6	0.0	0.2	0.1	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.2	6.3	12.9	0.8	7.1	0.1	6.4	0.0	1.7	0.5	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.7	23.2	43.5	17.2	24.5	17.2	29.6	0.0	21.9	29.5	0.0	40.1
LnGrp LOS	В	С	D	В	С	В	С	А	С	С	Α	<u> </u>
Approach Vol, veh/h		1423			928			478			235	
Approach Delay, s/veh		30.4			23.9			27.8			38.9	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	38.0	7.3	32.5	9.6	37.5	21.2	18.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	19.0	33.0				
Max Q Clear Time (g_c+I1), s	4.0	29.6	3.0	6.2	5.0	18.7	15.9	12.2				
Green Ext Time (p_c), s	0.0	2.2	0.0	0.7	0.0	4.8	0.4	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			28.7									
HCM 6th LOS			С									

Int Delay, s/veh	5.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		1	- 44	<b>**i</b>		
Traffic Vol, veh/h	8	109	129	0	1127	39	
Future Vol, veh/h	8	109	129	0	1127	39	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	425	-	-	-	
Veh in Median Storage	e, # 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	81	81	92	92	90	90	
Heavy Vehicles, %	0	3	4	3	3	0	
Mvmt Flow	10	135	140	0	1252	43	

Major/Minor	Minor2	N	Major1	Ma	jor2	
Conflicting Flow All	1554	648	1295	0	-	0
Stage 1	1274	-	-	-	-	-
Stage 2	280	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	132	352	276	-	-	-
Stage 1	170	-	-	-	-	-
Stage 2	722	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	r 65	352	276	-	-	-
Mov Cap-2 Maneuver	r 65	-	-	-	-	-
Stage 1	84	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	EB	NB	SB	
HCM Control Delay, s	32.7	30.8	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	276	- 270	-	-
HCM Lane V/C Ratio	0.508	- 0.535	-	-
HCM Control Delay (s)	30.8	- 32.7	-	-
HCM Lane LOS	D	- D	-	-
HCM 95th %tile Q(veh)	2.7	- 2.9	-	-
#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	18	9	13	39	17	77	6	324	67	76	473	30
Future Vol, veh/h	18	9	13	39	17	77	6	324	67	76	473	30
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	23	12	17	46	20	91	6	345	71	82	509	32

Major/Minor	Minor2		Ν	/linor1		N	Major1		Ν	/lajor2			
Conflicting Flow All	1141	1119	527	1097	1100	383	543	0	0	416	0	0	
Stage 1	691	691	-	393	393	-	-	-	-	-	-	-	
Stage 2	450	428	-	704	707	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	179	209	555	192	209	669	1036	-	-	1154	-	-	
Stage 1	438	449	-	636	599	-	-	-	-	-	-	-	
Stage 2	592	588	-	431	432	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	130	186	554	163	186	668	1034	-	-	1154	-	-	
Mov Cap-2 Maneuver	130	186	-	163	186	-	-	-	-	-	-	-	
Stage 1	434	402	-	631	594	-	-	-	-	-	-	-	
Stage 2	490	583	-	364	387	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	30.9	29.7	0.1	1.1	
HCM LOS	D	D			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1034	-	-	190	298	1154	-	-
HCM Lane V/C Ratio	0.006	-	-	0.273	0.525	0.071	-	-
HCM Control Delay (s)	8.5	0	-	30.9	29.7	8.4	0	-
HCM Lane LOS	А	А	-	D	D	А	А	-
HCM 95th %tile Q(veh)	0	-	-	1.1	2.9	0.2	-	-

	٠	-	7	*	•	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,		5	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Future Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	568	64	100	465	41	50	299	52	98	389	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	285	587	66	194	612	54	240	483	84	332	459	112
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1650	186	1795	1720	152	1810	1551	270	1795	1474	360
Grp Volume(v), veh/h	112	0	632	100	0	506	50	0	351	98	0	484
Grp Sat Flow(s),veh/h/ln	1795	0	1836	1795	0	1872	1810	0	1821	1795	0	1834
Q Serve(g_s), s	3.5	0.0	30.4	3.1	0.0	21.5	1.6	0.0	14.8	3.3	0.0	22.2
Cycle Q Clear(g_c), s	3.5	0.0	30.4	3.1	0.0	21.5	1.6	0.0	14.8	3.3	0.0	22.2
Prop In Lane	1.00		0.10	1.00		0.08	1.00		0.15	1.00		0.20
Lane Grp Cap(c), veh/h	285	0	653	194	0	666	240	0	566	332	0	571
V/C Ratio(X)	0.39	0.00	0.97	0.52	0.00	0.76	0.21	0.00	0.62	0.30	0.00	0.85
Avail Cap(c_a), veh/h	285	0	653	194	0	666	240	0	566	332	0	571
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	0.0	28.5	22.1	0.0	25.6	21.5	0.0	26.5	20.4	0.0	29.0
Incr Delay (d2), s/veh	4.0	0.0	28.2	9.5	0.0	8.0	2.0	0.0	5.0	2.3	0.0	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	17.6	1.7	0.0	10.5	0.8	0.0	6.9	1.5	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	56.7	31.6	0.0	33.6	23.4	0.0	31.5	22.7	0.0	43.6
LnGrp LOS	С	A	E	С	A	С	С	A	С	С	A	<u> </u>
Approach Vol, veh/h		744			606			401			582	
Approach Delay, s/veh		51.7			33.3			30.5			40.0	
Approach LOS		D			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	5.3	16.8	5.1	32.4	3.6	24.2	5.5	23.5				
Green Ext Time (p_c), s	0.0	1.5	0.0	0.0	0.0	1.1	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			40.4									
HCM 6th LOS			D									

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	18	693	16	4	577	9	1	4	14	0	2	41
Future Vol, veh/h	18	693	16	4	577	9	1	4	14	0	2	41
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	19	722	17	4	595	9	1	6	21	0	3	57

Major/Minor	Major1		Μ	lajor2		Ν	/linor1		Ν	Minor2			
Conflicting Flow All	606	0	0	740	0	0	1408	1384	732	1392	1388	602	
Stage 1	-	-	-	-	-	-	770	770	-	610	610	-	
Stage 2	-	-	-	-	-	-	638	614	-	782	778	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	982	-	-	876	-	-	118	145	413	121	144	494	
Stage 1	-	-	-	-	-	-	396	413	-	485	488	-	
Stage 2	-	-	-	-	-	-	468	486	-	390	410	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	980	-	-	875	-	-	100	139	413	108	138	493	
Mov Cap-2 Maneuver	-	-	-	-	-	-	100	139	-	108	138	-	
Stage 1	-	-	-	-	-	-	383	399	-	468	484	-	
Stage 2	-	-	-	-	-	-	409	482	-	353	396	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.2			0.1			20.4			14.5			
HCM LOS							С			В			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR S	SBLn1		
Capacity (veh/h)	261	980	-	-	875	-	-	440		
HCM Lane V/C Ratio	0.107	0.019	-	-	0.005	-	-	0.136		
HCM Control Delay (s)	20.4	8.7	0	-	9.1	0	-	14.5		
HCM Lane LOS	С	А	А	-	А	А	-	В		
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.5		

### Appendix E – Analysis Report Future Without Project Conditions Mitigation

2042 AM Without Project - Left Turn Lanes along Kekuanaoa Street 4: Manono Street & Kekuanaoa Street

	٠	<b>→</b>	7	4	+	*	1	Ť	1	5	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	+	1	7	•	1	7	ţ,		7	ĥ	
Traffic Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Future Volume (veh/h)	89	382	32	25	511	25	72	314	49	75	288	69
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	99	424	36	29	601	29	87	378	59	86	331	79
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	219	660	572	328	665	554	279	480	75	253	454	108
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1856	1608	1753	1870	1558	1725	1542	241	1697	1459	348
Grp Volume(v), veh/h	99	424	36	29	601	29	87	0	437	86	0	410
Grp Sat Flow(s),veh/h/ln	1781	1856	1608	1753	1870	1558	1725	0	1783	1697	0	1808
Q Serve(g_s), s	3.1	17.2	1.3	0.9	27.5	1.1	3.0	0.0	20.1	3.0	0.0	18.2
Cycle Q Clear(g_c), s	3.1	17.2	1.3	0.9	27.5	1.1	3.0	0.0	20.1	3.0	0.0	18.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.14	1.00		0.19
Lane Grp Cap(c), veh/h	219	660	572	328	665	554	279	0	555	253	0	562
V/C Ratio(X)	0.45	0.64	0.06	0.09	0.90	0.05	0.31	0.00	0.79	0.34	0.00	0.73
Avail Cap(c_a), veh/h	219	660	572	328	665	554	279	0	555	253	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.3	24.2	19.1	17.6	27.5	19.0	21.0	0.0	28.3	21.5	0.0	27.6
Incr Delay (d2), s/veh	6.6	4.8	0.2	0.5	18.0	0.2	2.9	0.0	10.8	3.6	0.0	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.6	8.0	0.5	0.4	14.8	0.4	1.4	0.0	9.8	1.4	0.0	8.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.9	29.0	19.3	18.1	45.5	19.2	23.9	0.0	39.1	25.1	0.0	35.7
LnGrp LOS	С	С	В	В	D	В	С	Α	D	С	Α	D
Approach Vol, veh/h		559			659			524			496	
Approach Delay, s/veh		28.2			43.1			36.6			33.9	
Approach LOS		С			D			D			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	5.0	22.1	2.9	19.2	5.0	20.2	5.1	29.5				
Green Ext Time (p_c), s	0.0	1.3	0.0	2.1	0.0	1.5	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay			35.8									

HCM 6th LOS

D

### 2042 PM Without Project - Left Turn Lanes along Kekuanaoa Street

4: Manono Street & Kekuanaoa Stree	: Manono Stre	eet & Kek	kuanaoa S	Street
------------------------------------	---------------	-----------	-----------	--------

04/20/2022

	٠	-	7	*	-	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	+	1	7	+	1	٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Future Volume (veh/h)	106	540	61	95	442	39	46	275	48	93	370	90
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	112	568	64	100	465	41	50	299	52	98	389	95
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	665	570	239	676	570	240	483	84	332	459	112
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1795	1870	1603	1795	1900	1603	1810	1551	270	1795	1474	360
Grp Volume(v), veh/h	112	568	64	100	465	41	50	0	351	98	0	484
Grp Sat Flow(s),veh/h/ln	1795	1870	1603	1795	1900	1603	1810	0	1821	1795	0	1834
Q Serve(g_s), s	3.5	25.3	2.4	3.1	18.8	1.5	1.6	0.0	14.8	3.3	0.0	22.2
Cycle Q Clear(g_c), s	3.5	25.3	2.4	3.1	18.8	1.5	1.6	0.0	14.8	3.3	0.0	22.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		0.20
Lane Grp Cap(c), veh/h	312	665	570	239	676	570	240	0	566	332	0	571
V/C Ratio(X)	0.36	0.85	0.11	0.42	0.69	0.07	0.21	0.00	0.62	0.30	0.00	0.85
Avail Cap(c_a), veh/h	312	665	570	239	676	570	240	0	566	332	0	571
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.9	26.8	19.5	20.6	24.7	19.2	21.5	0.0	26.5	20.4	0.0	29.0
Incr Delay (d2), s/veh	3.2	13.2	0.4	5.3	5.7	0.2	2.0	0.0	5.0	2.3	0.0	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.7	13.0	0.9	1.6	9.1	0.6	0.8	0.0	6.9	1.5	0.0	11.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.1	40.0	19.9	25.9	30.4	19.4	23.4	0.0	31.5	22.7	0.0	43.6
LnGrp LOS	С	D	В	С	С	В	С	А	С	С	А	D
Approach Vol, veh/h		744			606			401			582	
Approach Delay, s/veh		35.6			28.9			30.5			40.0	
Approach LOS		D			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max Q Clear Time (g_c+I1), s	5.3	16.8	5.1	27.3	3.6	24.2	5.5	20.8				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.6	0.0	1.1	0.0	2.2				
Intersection Summary												
HCM 6th Ctrl Delay			34.1									
HCM 6th LOS			С									

Appendix F – Analysis Report Future With Project Conditions

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2027 AM - With Project 06/27/2022

	٠	-	7	*	-	*	1	1	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	ţ,		7	ħ	
Traffic Volume (veh/h)	88	501	322	60	767	12	202	61	71	26	70	108
Future Volume (veh/h)	88	501	322	60	767	12	202	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	563	362	65	834	13	224	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	348	1491	670	365	1487	664	345	185	215	335	101	156
Arrive On Green	0.06	0.43	0.43	0.05	0.42	0.42	0.12	0.24	0.24	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	563	362	65	834	13	224	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.4	8.6	13.5	1.6	14.0	0.4	8.1	0.0	5.7	1.0	0.0	8.4
Cycle Q Clear(g_c), s	2.4	8.6	13.5	1.6	14.0	0.4	8.1	0.0	5.7	1.0	0.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	348	1491	670	365	1487	664	345	0	401	335	0	256
V/C Ratio(X)	0.28	0.38	0.54	0.18	0.56	0.02	0.65	0.00	0.37	0.08	0.00	0.74
Avail Cap(c_a), veh/h	361	1491	670	392	1487	664	345	0	1016	398	0	933
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.8	15.2	16.6	11.9	17.1	13.2	23.4	0.0	24.9	26.7	0.0	31.8
Incr Delay (d2), s/veh	0.4	0.7	3.1	0.2	1.5	0.1	4.3	0.0	0.6	0.1	0.0	4.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.3	5.2	0.6	5.5	0.1	3.6	0.0	2.2	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	15.9	19.7	12.1	18.7	13.2	27.6	0.0	25.5	26.8	0.0	36.0
LnGrp LOS	В	В	В	В	В	В	С	A	С	С	A	<u> </u>
Approach Vol, veh/h		1024			912			371			219	
Approach Delay, s/veh		17.0			18.1			26.8			34.9	
Approach LOS		В			В			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	38.6	7.3	23.5	9.4	38.0	14.0	16.8				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	5.0	33.0	9.0	43.0				
Max Q Clear Time (g_c+l1), s	3.6	15.5	3.0	7.7	4.4	16.0	10.1	10.4				
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			20.4									
HCM 6th LOS			С									

7

#### Intersection

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		٦	- 11	朴朴	
Traffic Vol, veh/h	12	66	219	0	702	56
Future Vol, veh/h	12	66	219	0	702	56
Conflicting Peds, #/hr	0	0	2	0	0	2
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	425	-	-	-
Veh in Median Storage	, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	86	86	82	82	92	92
Heavy Vehicles, %	0	6	4	0	9	23
Mvmt Flow	14	77	267	0	763	61

Major/Minor	Minor2	Ν	/lajor1	Ма	jor2				
Conflicting Flow All	1330	414	826	0	-	0			
Stage 1	796	-	-	-	-	-			
Stage 2	534	-	-	-	-	-			
Critical Hdwy	6.25	7.22	5.38	-	-	-			
Critical Hdwy Stg 1	6.6	-	-	-	-	-			
Critical Hdwy Stg 2	5.8	-	-	-	-	-			
Follow-up Hdwy	3.65	3.96	3.14	-	-	-			
Pot Cap-1 Maneuver	178	493	468	-	-	-			
Stage 1	334	-	-	-	-	-			
Stage 2	540	-	-	-	-	-			
Platoon blocked, %				-	-	-			
Mov Cap-1 Maneuver	76	492	467	-	-	-			
Mov Cap-2 Maneuver	76	-	-	-	-	-			
Stage 1	143	-	-	-	-	-			
Stage 2	539	-	-	-	-	-			
Annroach	FB		NR		SB				

Approach	EB	NB	SB	
HCM Control Delay, s	25.3	22.5	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EB	BLn1	SBT	SBR
Capacity (veh/h)	467	-	267	-	-
HCM Lane V/C Ratio	0.572	- (	0.34	-	-
HCM Control Delay (s)	22.5	- 2	25.3	-	-
HCM Lane LOS	С	-	D	-	-
HCM 95th %tile Q(veh)	3.5	-	1.4	-	-

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	29	23	18	31	40	77	24	218	76	49	334	43
Future Vol, veh/h	29	23	18	31	40	77	24	218	76	49	334	43
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	256	89	56	384	49

Major/Minor	Minor2		l	Minor1		I	Major1			Ν	lajor2			
Conflicting Flow All	954	923	410	906	903	302	434	0	(	0	345	0	0	
Stage 1	522	522	-	357	357	-	-	-		-	-	-	-	
Stage 2	432	401	-	549	546	-	-	-		-	-	-	-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-		-	4.14	-	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-		-	-	-	-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-		-	-	-	-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-		-	2.236	-	-	
Pot Cap-1 Maneuver	230	255	646	250	271	726	1136	-		-	1203	-	-	
Stage 1	522	507	-	646	618	-	-	-		-	-	-	-	
Stage 2	585	576	-	508	508	-	-	-		-	-	-	-	
Platoon blocked, %								-		-		-	-	
Mov Cap-1 Maneuver	156	232	645	201	246	725	1135	-		-	1203	-	-	
Mov Cap-2 Maneuver	156	232	-	201	246	-	-	-		-	-	-	-	
Stage 1	505	475	-	626	599	-	-	-		-	-	-	-	
Stage 2	449	558	-	428	476	-	-	-		-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	32.6	26.5	0.6	0.9	
HCM LOS	D	D			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR	
Capacity (veh/h)	1135	-	-	224	350	1203	-	-	
HCM Lane V/C Ratio	0.025	-	-	0.428	0.535	0.047	-	-	
HCM Control Delay (s)	8.3	0	-	32.6	26.5	8.1	0	-	
HCM Lane LOS	А	А	-	D	D	А	А	-	
HCM 95th %tile Q(veh)	0.1	-	-	2	3	0.1	-	-	

	٠	-	7	*	+	*	1	t	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ţ,		7	ħ		7	ħ		7	ħ	
Traffic Volume (veh/h)	96	294	32	25	423	25	72	270	49	75	230	74
Future Volume (veh/h)	96	294	32	25	423	25	72	270	49	75	230	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	327	36	29	498	29	87	325	59	86	264	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	239	547	60	345	583	34	348	501	91	317	452	145
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1781	1642	181	1753	1750	102	1725	1504	273	1697	1355	436
Grp Volume(v), veh/h	107	0	363	29	0	527	87	0	384	86	0	349
Grp Sat Flow(s),veh/h/ln	1781	0	1823	1753	0	1852	1725	0	1777	1697	0	1792
Q Serve(g_s), s	3.5	0.0	14.9	0.9	0.0	23.9	2.9	0.0	16.5	2.9	0.0	14.5
Cycle Q Clear(g_c), s	3.5	0.0	14.9	0.9	0.0	23.9	2.9	0.0	16.5	2.9	0.0	14.5
Prop In Lane	1.00		0.10	1.00		0.06	1.00		0.15	1.00		0.24
Lane Grp Cap(c), veh/h	239	0	608	345	0	617	348	0	592	317	0	597
V/C Ratio(X)	0.45	0.00	0.60	0.08	0.00	0.85	0.25	0.00	0.65	0.27	0.00	0.58
Avail Cap(c_a), veh/h	239	0	608	345	0	617	348	0	592	317	0	597
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.5	0.0	25.0	18.4	0.0	28.0	19.0	0.0	25.5	19.4	0.0	24.8
Incr Delay (d2), s/veh	6.0	0.0	4.3	0.5	0.0	14.0	1.7	0.0	5.4	2.1	0.0	4.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.8	0.0	6.9	0.4	0.0	12.4	1.3	0.0	7.5	1.3	0.0	6.6
Unsig. Movement Delay, s/veh	-											
LnGrp Delay(d),s/veh	27.5	0.0	29.3	18.8	0.0	42.0	20.7	0.0	30.9	21.5	0.0	29.0
LnGrp LOS	С	A	С	В	A	D	С	A	С	С	A	<u> </u>
Approach Vol, veh/h		470			556			471			435	
Approach Delay, s/veh		28.9			40.8			29.0			27.5	
Approach LOS		С			D			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0				
Max Q Clear Time (g_c+I1), s	4.9	18.5	2.9	16.9	4.9	16.5	5.5	25.9				
Green Ext Time (p_c), s	0.0	1.7	0.0	1.7	0.0	1.7	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			32.0									
HCM 6th LOS			С									

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	24	429	5	5	558	7	8	1	8	6	3	34
Future Vol, veh/h	24	429	5	5	558	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	488	6	6	656	8	15	2	15	8	4	47

Major/Minor	Major1		Ν	/lajor2		1	Minor1		Ν	/linor2			
Conflicting Flow All	666	0	0	497	0	0	1246	1226	494	1228	1225	662	
Stage 1	-	-	-	-	-	-	548	548	-	674	674	-	
Stage 2	-	-	-	-	-	-	698	678	-	554	551	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	933	-	-	1077	-	-	152	180	579	156	180	465	
Stage 1	-	-	-	-	-	-	524	520	-	448	457	-	
Stage 2	-	-	-	-	-	-	434	455	-	520	519	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	931	-	-	1074	-	-	129	170	577	145	170	464	
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	170	-	145	170	-	
Stage 1	-	-	-	-	-	-	501	498	-	429	452	-	
Stage 2	-	-	-	-	-	-	383	450	-	484	497	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.5			0.1			25.4			18.5			
HCM LOS							D			С			
Minor Lane/Major Mvr	nt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				

ivilnor Lane/iviajor ivivmt	INBLUI	ERL	ERI	EBK	VVBL	<b>WRI</b>	<b>WRK</b>	SBLUI	
Capacity (veh/h)	208	931	-	-	1074	-	-	325	
HCM Lane V/C Ratio	0.154	0.029	-	-	0.005	-	-	0.181	
HCM Control Delay (s)	25.4	9	0	-	8.4	0	-	18.5	
HCM Lane LOS	D	А	А	-	А	А	-	С	
HCM 95th %tile Q(veh)	0.5	0.1	-	-	0	-	-	0.7	

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2027 PM - With Project 06/27/2022

	٠	-	7	*	+	*	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	f,		7	ħ	
Traffic Volume (veh/h)	96	613	418	65	645	9	281	54	46	21	70	97
Future Volume (veh/h)	96	613	418	65	645	9	281	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	652	445	71	701	10	323	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	354	1376	604	303	1366	607	442	279	239	340	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.38	0.38	0.17	0.30	0.30	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	652	445	71	701	10	323	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	2.8	11.4	20.2	1.9	12.5	0.3	11.7	0.0	4.2	1.0	0.0	9.7
Cycle Q Clear(g_c), s	2.8	11.4	20.2	1.9	12.5	0.3	11.7	0.0	4.2	1.0	0.0	9.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	354	1376	604	303	1366	607	442	0	518	340	0	272
V/C Ratio(X)	0.29	0.47	0.74	0.23	0.51	0.02	0.73	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	429	1376	604	346	1366	607	505	0	974	400	0	721
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.3	19.3	22.0	15.1	20.0	16.2	22.5	0.0	21.9	28.0	0.0	33.6
Incr Delay (d2), s/veh	0.4	1.2	7.8	0.4	1.4	0.0	4.6	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	4.7	8.5	0.8	5.2	0.1	5.2	0.0	1.6	0.4	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.7	20.5	29.8	15.5	21.4	16.2	27.1	0.0	22.1	28.1	0.0	38.1
LnGrp LOS	В	С	С	В	С	В	С	A	С	С	A	D
Approach Vol, veh/h		1199			782			438			235	
Approach Delay, s/veh		23.5			20.8			25.8			37.0	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.0	9.5	36.5	19.1	18.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	8.0	30.0	17.0	35.0				
Max Q Clear Time (g_c+l1), s	3.9	22.2	3.0	6.2	4.8	14.5	13.7	11.7				
Green Ext Time (p_c), s	0.0	4.2	0.0	0.7	0.1	4.2	0.3	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			С									

Int Delay, s/veh	4.9						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		1	- 11	<b>**i</b>		
Traffic Vol, veh/h	8	116	134	0	931	40	
Future Vol, veh/h	8	116	134	0	931	40	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	425	-	-	-	
Veh in Median Storage	,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	81	81	92	92	90	90	
Heavy Vehicles, %	0	3	4	3	3	0	
Mvmt Flow	10	143	146	0	1034	44	

Major/Minor	Minor2	ľ	Major1	Мај	or2	
Conflicting Flow All	1348	539	1078	0	-	0
Stage 1	1056	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	174	415	353	-	-	-
Stage 1	232	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	r 102	415	353	-	-	-
Mov Cap-2 Maneuver	r 102	-	-	-	-	-
Stage 1	136	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB	
HCM Control Delay, s	23.4	22.2	0	
HCMLOS	С			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	353	- 346	-	-
HCM Lane V/C Ratio	0.413	- 0.442	-	-
HCM Control Delay (s)	22.2	- 23.4	-	-
HCM Lane LOS	С	- C	-	-
HCM 95th %tile Q(veh)	2	- 2.2	-	-

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	23	16	18	39	23	77	11	275	67	76	387	34
Future Vol, veh/h	23	16	18	39	23	77	11	275	67	76	387	34
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	293	71	82	416	37

Major/Minor	Minor2		Ν	1inor1		1	Major1		N	Major2			
Conflicting Flow All	1015	989	437	974	972	331	455	0	0	364	0	0	
Stage 1	601	601	-	353	353	-	-	-	-	-	-	-	
Stage 2	414	388	-	621	619	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	219	249	624	233	249	715	1116	-	-	1206	-	-	
Stage 1	491	493	-	668	624	-	-	-	-	-	-	-	
Stage 2	620	612	-	478	474	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	159	223	623	192	223	714	1114	-	-	1206	-	-	
Mov Cap-2 Maneuver	159	223	-	192	223	-	-	-	-	-	-	-	
Stage 1	483	447	-	659	615	-	-	-	-	-	-	-	
Stage 2	509	603	-	399	430	-	_	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	27.6	25.5	0.3	1.3	
HCM LOS	D	D			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1114	-	-	232	336	1206	-	-
HCM Lane V/C Ratio	0.011	-	-	0.319	0.487	0.068	-	-
HCM Control Delay (s)	8.3	0	-	27.6	25.5	8.2	0	-
HCM Lane LOS	А	А	-	D	D	А	А	-
HCM 95th %tile Q(veh)	0	-	-	1.3	2.5	0.2	-	-

	٠	-	7	*	-	*	1	t	1	1	ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ţ,		7	ţ,		٦	ţ,		٦	ţ,	
Traffic Volume (veh/h)	108	420	61	95	366	39	46	231	48	93	287	92
Future Volume (veh/h)	108	420	61	95	366	39	46	231	48	93	287	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	114	442	64	100	385	41	50	251	52	98	302	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	312	532	77	250	562	60	327	501	104	396	459	147
Arrive On Green	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33	0.06	0.33	0.33
Sat Flow, veh/h	1795	1596	231	1795	1687	180	1810	1502	311	1795	1377	442
Grp Volume(v), veh/h	114	0	506	100	0	426	50	0	303	98	0	399
Grp Sat Flow(s),veh/h/ln	1795	0	1828	1795	0	1867	1810	0	1813	1795	0	1819
Q Serve(g_s), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	12.0	3.2	0.0	16.9
Cycle Q Clear(g_c), s	3.7	0.0	23.0	3.2	0.0	17.7	1.6	0.0	12.0	3.2	0.0	16.9
Prop In Lane	1.00		0.13	1.00		0.10	1.00		0.17	1.00		0.24
Lane Grp Cap(c), veh/h	312	0	609	250	0	622	327	0	604	396	0	606
V/C Ratio(X)	0.37	0.00	0.83	0.40	0.00	0.68	0.15	0.00	0.50	0.25	0.00	0.66
Avail Cap(c_a), veh/h	312	0	609	250	0	622	327	0	604	396	0	606
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	27.7	21.1	0.0	25.9	18.9	0.0	24.0	18.7	0.0	25.6
Incr Delay (d2), s/veh	3.3	0.0	12.5	4.7	0.0	6.0	1.0	0.0	3.0	1.5	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.8	0.0	11.6	1.6	0.0	8.5	0.7	0.0	5.4	1.4	0.0	7.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.2	0.0	40.1	25.8	0.0	31.9	19.9	0.0	27.0	20.1	0.0	31.1
LnGrp LOS	С	Α	D	С	Α	С	В	А	С	С	Α	C
Approach Vol, veh/h		620			526			353			497	
Approach Delay, s/veh		37.0			30.8			26.0			29.0	
Approach LOS		D			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	35.0	10.0	35.0	10.0	35.0	10.0	35.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	30.0	5.0	30.0	5.0	30.0	5.0	30.0				
Max Q Clear Time (g_c+l1), s	5.2	14.0	5.2	25.0	3.6	18.9	5.7	19.7				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.4	0.0	1.8	0.0	1.8				
Intersection Summary												
HCM 6th Ctrl Delay			31.4									
HCM 6th LOS			С									

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	20	575	16	4	503	9	1	4	14	0	2	43
Future Vol, veh/h	20	575	16	4	503	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	599	17	4	519	9	1	6	21	0	3	60

Major/Minor	Major1		N	Major2			Minor1		I	Minor2			
Conflicting Flow All	530	0	0	617	0	0	1214	1189	609	1197	1193	526	
Stage 1	-	-	-	-	-	-	651	651	-	534	534	-	
Stage 2	-	-	-	-	-	-	563	538	-	663	659	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	1048	-	-	973	-	-	160	190	486	164	188	546	
Stage 1	-	-	-	-	-	-	461	468	-	534	528	-	
Stage 2	-	-	-	-	-	-	514	526	-	454	464	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1046	-	-	972	-	-	137	182	486	149	180	545	
Mov Cap-2 Maneuver	-	-	-	-	-	-	137	182	-	149	180	-	
Stage 1	-	-	-	-	-	-	446	453	-	516	524	-	
Stage 2	-	-	-	-	-	-	453	522	-	416	449	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.1			17			13.2			
HCM LOS	0.0						C			B			
							Ū			_			
Minor Lane/Maior Myn	nt	NBLn1	FBL	EBT	EBR	WBL	WBT	WBR	SBLn1				

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR \$	SBLn1	
Capacity (veh/h)	327	1046	-	-	972	-	-	500	
HCM Lane V/C Ratio	0.085	0.02	-	-	0.004	-	-	0.125	
HCM Control Delay (s)	17	8.5	0	-	8.7	0	-	13.2	
HCM Lane LOS	С	А	А	-	А	А	-	В	
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4	

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2032 AM - With Project 06/27/2022

	٠	-	7	*	+	*	1	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	<b>^</b>	1	7	<b>^</b>	1	٦	¢Î,		۲	ţ,	
Traffic Volume (veh/h)	88	534	342	60	818	12	216	61	71	26	70	108
Future Volume (veh/h)	88	534	342	60	818	12	216	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	600	384	65	889	13	240	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	323	1470	660	343	1466	655	362	193	225	333	100	155
Arrive On Green	0.06	0.42	0.42	0.05	0.42	0.42	0.13	0.25	0.25	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	600	384	65	889	13	240	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.5	9.6	15.0	1.7	15.6	0.4	8.8	0.0	5.7	1.0	0.0	8.6
Cycle Q Clear(g_c), s	2.5	9.6	15.0	1.7	15.6	0.4	8.8	0.0	5.7	1.0	0.0	8.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	323	1470	660	343	1466	655	362	0	418	333	0	255
V/C Ratio(X)	0.31	0.41	0.58	0.19	0.61	0.02	0.66	0.00	0.35	0.08	0.00	0.75
Avail Cap(c_a), veh/h	336	1470	660	391	1466	655	362	0	1001	394	0	898
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.6	15.9	17.5	12.4	18.1	13.7	23.3	0.0	24.6	27.1	0.0	32.3
Incr Delay (d2), s/veh	0.5	0.8	3.7	0.3	1.9	0.1	4.5	0.0	0.5	0.1	0.0	4.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	0.9	3.7	5.8	0.6	6.2	0.1	3.9	0.0	2.2	0.4	0.0	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.1	16.8	21.2	12.7	20.0	13.7	27.8	0.0	25.1	27.3	0.0	36.6
LnGrp LOS	В	В	С	В	В	В	С	Α	С	С	А	D
Approach Vol, veh/h		1083			967			387			219	
Approach Delay, s/veh		18.1			19.4			26.8			35.4	
Approach LOS		В			В			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	38.6	7.3	24.6	9.4	38.0	15.0	16.9				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	10.0	42.0				
Max Q Clear Time (g_c+I1), s	3.7	17.0	3.0	7.7	4.5	17.6	10.8	10.6				
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.5	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			21.3									
HCM 6th LOS			С									

Int Delay, s/veh	7.7						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		٦	- 11	<b>**i</b>		
Traffic Vol, veh/h	13	67	220	0	748	57	
Future Vol, veh/h	13	67	220	0	748	57	
Conflicting Peds, #/hr	0	0	2	0	0	2	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	425	-	-	-	
Veh in Median Storage	,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	86	86	82	82	92	92	
Heavy Vehicles, %	0	6	4	0	9	23	
Mvmt Flow	15	78	268	0	813	62	

Major/Minor	Minor2	Ν	/lajor1	Ma	jor2		
Conflicting Flow All	1382	440	877	0	-	0	
Stage 1	846	-	-	-	-	-	
Stage 2	536	-	-	-	-	-	
Critical Hdwy	6.25	7.22	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.96	3.14	-	-	-	
Pot Cap-1 Maneuver	166	474	442	-	-	-	
Stage 1	311	-	-	-	-	-	
Stage 2	539	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	65	473	441	-	-	-	
Mov Cap-2 Maneuver	65	-	-	-	-	-	
Stage 1	122	-	-	-	-	-	
Stage 2	538	-	-	-	-	-	

Approach	EB	NB	SB	
HCM Control Delay, s	30.2	25	0	
HCMLOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	441	- 234	-	-
HCM Lane V/C Ratio	0.608	- 0.398	-	-
HCM Control Delay (s)	25	- 30.2	-	-
HCM Lane LOS	D	- D	-	-
HCM 95th %tile Q(veh)	3.9	- 1.8	-	-

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	29	23	18	31	40	77	24	233	76	49	354	43
Future Vol, veh/h	29	23	18	31	40	77	24	233	76	49	354	43
Conflicting Peds, #/hr	1	0	0	0	0	1	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	73	73	73	79	79	79	85	85	85	87	87	87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	274	89	56	407	49

Major/Minor	Minor2			Minor1		l	Major1		I	Major2			
Conflicting Flow All	995	964	433	947	944	320	457	0	0	363	0	0	
Stage 1	545	545	-	375	375	-	-	-	-	-	-	-	
Stage 2	450	419	-	572	569	-	-	-	-	-	-	-	
Critical Hdwy	7.21	6.67	6.2	7.19	6.58	6.27	4.1	-	-	4.14	-	-	
Critical Hdwy Stg 1	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.21	5.67	-	6.19	5.58	-	-	-	-	-	-	-	
Follow-up Hdwy	3.599	4.153	3.3	3.581	4.072	3.363	2.2	-	-	2.236	-	-	
Pot Cap-1 Maneuver	215	241	627	234	256	709	1114	-	-	1185	-	-	
Stage 1	507	495	-	632	607	-	-	-	-	-	-	-	
Stage 2	572	565	-	493	496	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	143	218	626	186	232	708	1113	-	-	1185	-	-	
Mov Cap-2 Maneuver	143	218	-	186	232	-	-	-	-	-	-	-	
Stage 1	490	463	-	612	588	-	-	-	-	-	-	-	
Stage 2	436	547	-	413	464	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	36.3	29.3	0.6	0.9	
HCM LOS	Е	D			

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1113	-	-	208	330	1185	-	-
HCM Lane V/C Ratio	0.025	-	-	0.461	0.568	0.048	-	-
HCM Control Delay (s)	8.3	0	-	36.3	29.3	8.2	0	-
HCM Lane LOS	А	А	-	Е	D	А	А	-
HCM 95th %tile Q(veh)	0.1	-	-	2.2	3.3	0.1	-	-

	٠	-	7	*	•	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ţ,		7	ħ		7	ħ		7	ħ	
Traffic Volume (veh/h)	96	322	32	25	451	25	72	287	49	75	251	74
Future Volume (veh/h)	96	322	32	25	451	25	72	287	49	75	251	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	358	36	29	531	29	87	346	59	86	289	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	230	571	57	337	605	33	317	490	84	289	447	132
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1781	1658	167	1753	1757	96	1725	1520	259	1697	1388	408
Grp Volume(v), veh/h	107	0	394	29	0	560	87	0	405	86	0	374
Grp Sat Flow(s),veh/h/ln	1781	0	1825	1753	0	1853	1725	0	1779	1697	0	1797
Q Serve(g_s), s	3.5	0.0	16.2	0.9	0.0	25.6	3.0	0.0	18.0	3.0	0.0	16.0
Cycle Q Clear(g_c), s	3.5	0.0	16.2	0.9	0.0	25.6	3.0	0.0	18.0	3.0	0.0	16.0
Prop In Lane	1.00		0.09	1.00		0.05	1.00		0.15	1.00		0.23
Lane Grp Cap(c), veh/h	230	0	629	337	0	638	317	0	573	289	0	579
V/C Ratio(X)	0.46	0.00	0.63	0.09	0.00	0.88	0.27	0.00	0.71	0.30	0.00	0.65
Avail Cap(c_a), veh/h	230	0	629	337	0	638	317	0	573	289	0	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	0.0	24.7	18.0	0.0	27.7	19.9	0.0	26.8	20.3	0.0	26.1
Incr Delay (d2), s/veh	6.6	0.0	4.7	0.5	0.0	15.7	2.1	0.0	7.2	2.6	0.0	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.8	0.0	7.5	0.4	0.0	13.4	1.3	0.0	8.4	1.3	0.0	7.4
Unsig. Movement Delay, s/veh							<b></b>					
LnGrp Delay(d),s/veh	28.0	0.0	29.3	18.5	0.0	43.4	22.1	0.0	33.9	23.0	0.0	31.6
LnGrp LOS	С	A	С	В	A	D	С	A	С	С	A	C
Approach Vol, veh/h		501			589			492			460	
Approach Delay, s/veh		29.0			42.2			31.8			30.0	
Approach LOS		С			D			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0				
Max Q Clear Time (g_c+l1), s	5.0	20.0	2.9	18.2	5.0	18.0	5.5	27.6				
Green Ext Time (p_c), s	0.0	1.6	0.0	1.9	0.0	1.6	0.0	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			33.7									
HCM 6th LOS			С									

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			\$			\$			\$	
Traffic Vol, veh/h	24	456	5	5	586	7	8	1	8	6	3	34
Future Vol, veh/h	24	456	5	5	586	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	518	6	6	689	8	15	2	15	8	4	47

Major1		Ν	Aajor2			Minor1		1	Minor2			
699	0	0	527	0	0	1309	1289	524	1291	1288	695	
-	-	-	-	-	-	578	578	-	707	707	-	
-	-	-	-	-	-	731	711	-	584	581	-	
4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
907	-	-	1050	-	-	138	165	557	142	165	446	
-	-	-	-	-	-	505	504	-	429	441	-	
-	-	-	-	-	-	416	439	-	501	503	-	
	-	-		-	-							
905	-	-	1047	-	-	116	156	555	131	156	445	
-	-	-	-	-	-	116	156	-	131	156	-	
-	-	-	-	-	-	482	481	-	410	436	-	
-	-	-	-	-	-	366	434	-	465	480	-	
									00			
EB			VVB			NB			SB			
0.5			0.1			27.9			19.7			
						D			С			
<b>.</b> +		EDI	ГРТ					1				
IL		EBL	EBI	EBR	VVBL	VVBI	VVBR 3	SPLUI				
	Major1 699 - 4.1 - 2.2 907 - 905 - 905 - 905 - 0.5	Major1 699 0  4.1 -  2.2 - 907 -  905 -  905 -  905 -  905 - - 1 905 - - 1 180	Major1     N       699     0     0       -     -     -       -     -     -       4.1     -     -       -     -     -       2.2     -     -       907     -     -       -     -     -       907     -     -       -     -     -       905     -     -       -     -     -       905     -     -       -     -     -       905     -     -       -     -     -       905     -     -       -     -     -       1     -     -       -     -     -       -     -     -       -     -     -       -     -     -       -     -     -       -     -     - <tr td="">     -       -&lt;</tr>	Major1     Major2       699     0     0     527       -     -     -     -       -     -     -     -       4.1     -     -     4.1       -     -     -     -       2.2     -     2.2     907     -     1050       -     -     -     -     -     -     -       907     -     1050     -	Major1     Major2       699     0     0     527     0       -     -     -     -     -       -     -     -     -     -       4.1     -     4.1     -       -     -     -     -     -       -     -     -     -     -       2.2     -     2.2     -       907     -     1050     -       -     -     -     -       907     -     1047     -       -     -     -     -     -       905     -     1047     -     -       -     -     -     -     -     -       -     -     -     -     -     -     -       905     0.5     0.1     -     -     -     -     -       -     -     -     -     -     -     -     -       -     - <td>Major1     Major2     I       699     0     0     527     0     0       -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       4.1     -     4.1     -     -     -     -     -       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       2.2     -     -     2.2     -</td> <td>Major1     Major2     Minor1       699     0     0     527     0     0     1309       -     -     -     -     -     578       -     -     -     -     578       -     -     -     -     578       -     -     -     -     731       4.1     -     -     7.1     -     -       -     -     -     -     6.1     -       -     -     -     2.2     -     3.5     907       907     -     1050     -     138     -     -     505       -     -     -     -     505     -     -     416       -     -     -     1047     -     116       -     -     -     -     482     -     -     366       EB     WB     WB     NB     NB     0.5     0.1     27.9     D</td> <td>Major1     Major2     Minor1       699     0     0     527     0     0     1309     1289       -     -     -     -     -     578     578       -     -     -     -     -     731     711       4.1     -     -     7.1     6.5     -     -     6.1     5.5       -     -     -     -     6.1     5.5     -     -     6.1     5.5       2.2     -     2.2     -     3.5     4     907     -     1050     -     138     165       -     -     -     -     505     504     -     -     505     504       -     -     -     -     -     116     156       -     -     -     -     -     116     156       -     -     -     -     -     366     434       EB     WB     WB     NB</td> <td>Major1     Major2     Minor1     N       699     0     0     527     0     0     1309     1289     524       -     -     -     -     578     578     -       -     -     -     -     578     578     -       -     -     -     -     731     711     -       4.1     -     -     7.1     6.5     6.2     -       -     -     -     -     6.1     5.5     -       -     -     -     -     6.1     5.5     -       2.2     -     -     3.5     4     3.3       907     -     1050     -     138     165     557       -     -     -     -     505     504     -       -     -     -     -     116     156     555       -     -     -     -     -     366     434       <td< td=""><td>Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291       -     -     -     -     578     578     707       -     -     -     -     578     578     707       -     -     -     -     731     711     584       4.1     -     -     7.1     6.5     6.2     7.1       -     -     -     -     6.1     5.5     -     6.1       -     -     -     -     6.1     5.5     -     6.1       2.2     -     2.2     -     3.5     4     3.3     3.5       907     -     1050     -     138     165     557     142       -     -     -     -     116     156     555     131       -     -     -     -     116     156     131</td><td>Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291     1288       -     -     -     -     578     578     -     707     707       -     -     -     -     731     711     -     584     581       4.1     -     -     7.1     6.5     6.2     7.1     6.5       -     -     -     -     6.1     5.5     -     6.1     5.5       -     -     2.2     -     3.5     4     3.3     3.5     4       907     -     1050     -     138     165     557     142     165       -     -     -     -     505     504     -     429     441       -     -     -     116     156     555     131     156       -     -     -     -     116     156<td>Major1   Major2   Minor1   Minor2     699   0   0   527   0   0   1309   1289   524   1291   1288   695     -   -   -   -   578   578   -   707   707   -     -   -   -   -   731   711   -   584   581   -     4.1   -   -   7.1   6.5   6.2   7.1   6.5   6.2     -   -   -   -   6.1   5.5   -   6.1   5.5   -     -   -   -   -   -   6.1   5.5   -   6.1   5.5   -     2.2   -   -   3.5   4   3.3   3.5   4   3.3     907   -   1050   -   -   138   165   557   142   165   446     -   -   -   505   504   -   429   441   -     -   -   -   -   116   15</td></td></td<></td>	Major1     Major2     I       699     0     0     527     0     0       -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       4.1     -     4.1     -     -     -     -     -       -     -     -     -     -     -     -     -       -     -     -     -     -     -     -     -       2.2     -     -     2.2     -	Major1     Major2     Minor1       699     0     0     527     0     0     1309       -     -     -     -     -     578       -     -     -     -     578       -     -     -     -     578       -     -     -     -     731       4.1     -     -     7.1     -     -       -     -     -     -     6.1     -       -     -     -     2.2     -     3.5     907       907     -     1050     -     138     -     -     505       -     -     -     -     505     -     -     416       -     -     -     1047     -     116       -     -     -     -     482     -     -     366       EB     WB     WB     NB     NB     0.5     0.1     27.9     D	Major1     Major2     Minor1       699     0     0     527     0     0     1309     1289       -     -     -     -     -     578     578       -     -     -     -     -     731     711       4.1     -     -     7.1     6.5     -     -     6.1     5.5       -     -     -     -     6.1     5.5     -     -     6.1     5.5       2.2     -     2.2     -     3.5     4     907     -     1050     -     138     165       -     -     -     -     505     504     -     -     505     504       -     -     -     -     -     116     156       -     -     -     -     -     116     156       -     -     -     -     -     366     434       EB     WB     WB     NB	Major1     Major2     Minor1     N       699     0     0     527     0     0     1309     1289     524       -     -     -     -     578     578     -       -     -     -     -     578     578     -       -     -     -     -     731     711     -       4.1     -     -     7.1     6.5     6.2     -       -     -     -     -     6.1     5.5     -       -     -     -     -     6.1     5.5     -       2.2     -     -     3.5     4     3.3       907     -     1050     -     138     165     557       -     -     -     -     505     504     -       -     -     -     -     116     156     555       -     -     -     -     -     366     434 <td< td=""><td>Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291       -     -     -     -     578     578     707       -     -     -     -     578     578     707       -     -     -     -     731     711     584       4.1     -     -     7.1     6.5     6.2     7.1       -     -     -     -     6.1     5.5     -     6.1       -     -     -     -     6.1     5.5     -     6.1       2.2     -     2.2     -     3.5     4     3.3     3.5       907     -     1050     -     138     165     557     142       -     -     -     -     116     156     555     131       -     -     -     -     116     156     131</td><td>Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291     1288       -     -     -     -     578     578     -     707     707       -     -     -     -     731     711     -     584     581       4.1     -     -     7.1     6.5     6.2     7.1     6.5       -     -     -     -     6.1     5.5     -     6.1     5.5       -     -     2.2     -     3.5     4     3.3     3.5     4       907     -     1050     -     138     165     557     142     165       -     -     -     -     505     504     -     429     441       -     -     -     116     156     555     131     156       -     -     -     -     116     156<td>Major1   Major2   Minor1   Minor2     699   0   0   527   0   0   1309   1289   524   1291   1288   695     -   -   -   -   578   578   -   707   707   -     -   -   -   -   731   711   -   584   581   -     4.1   -   -   7.1   6.5   6.2   7.1   6.5   6.2     -   -   -   -   6.1   5.5   -   6.1   5.5   -     -   -   -   -   -   6.1   5.5   -   6.1   5.5   -     2.2   -   -   3.5   4   3.3   3.5   4   3.3     907   -   1050   -   -   138   165   557   142   165   446     -   -   -   505   504   -   429   441   -     -   -   -   -   116   15</td></td></td<>	Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291       -     -     -     -     578     578     707       -     -     -     -     578     578     707       -     -     -     -     731     711     584       4.1     -     -     7.1     6.5     6.2     7.1       -     -     -     -     6.1     5.5     -     6.1       -     -     -     -     6.1     5.5     -     6.1       2.2     -     2.2     -     3.5     4     3.3     3.5       907     -     1050     -     138     165     557     142       -     -     -     -     116     156     555     131       -     -     -     -     116     156     131	Major1     Major2     Minor1     Minor2       699     0     0     527     0     0     1309     1289     524     1291     1288       -     -     -     -     578     578     -     707     707       -     -     -     -     731     711     -     584     581       4.1     -     -     7.1     6.5     6.2     7.1     6.5       -     -     -     -     6.1     5.5     -     6.1     5.5       -     -     2.2     -     3.5     4     3.3     3.5     4       907     -     1050     -     138     165     557     142     165       -     -     -     -     505     504     -     429     441       -     -     -     116     156     555     131     156       -     -     -     -     116     156 <td>Major1   Major2   Minor1   Minor2     699   0   0   527   0   0   1309   1289   524   1291   1288   695     -   -   -   -   578   578   -   707   707   -     -   -   -   -   731   711   -   584   581   -     4.1   -   -   7.1   6.5   6.2   7.1   6.5   6.2     -   -   -   -   6.1   5.5   -   6.1   5.5   -     -   -   -   -   -   6.1   5.5   -   6.1   5.5   -     2.2   -   -   3.5   4   3.3   3.5   4   3.3     907   -   1050   -   -   138   165   557   142   165   446     -   -   -   505   504   -   429   441   -     -   -   -   -   116   15</td>	Major1   Major2   Minor1   Minor2     699   0   0   527   0   0   1309   1289   524   1291   1288   695     -   -   -   -   578   578   -   707   707   -     -   -   -   -   731   711   -   584   581   -     4.1   -   -   7.1   6.5   6.2   7.1   6.5   6.2     -   -   -   -   6.1   5.5   -   6.1   5.5   -     -   -   -   -   -   6.1   5.5   -   6.1   5.5   -     2.2   -   -   3.5   4   3.3   3.5   4   3.3     907   -   1050   -   -   138   165   557   142   165   446     -   -   -   505   504   -   429   441   -     -   -   -   -   116   15

Capacity (veh/h)	189	905	-	- 1047	-	-	304
HCM Lane V/C Ratio	0.17	0.03	-	- 0.006	-	- 0.	.194
HCM Control Delay (s)	27.9	9.1	0	- 8.5	0	- '	19.7
HCM Lane LOS	D	Α	Α	- A	А	-	С
HCM 95th %tile Q(veh)	0.6	0.1	-	- 0	-	-	0.7

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2032 PM - With Project 06/27/2022

	٠	-	7	*	+	*	1	1	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	ef (		7	ħ	
Traffic Volume (veh/h)	96	653	445	65	687	9	293	54	46	21	70	97
Future Volume (veh/h)	96	653	445	65	687	9	293	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	695	473	71	747	10	337	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	334	1364	599	286	1353	602	452	285	243	339	114	157
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.18	0.31	0.31	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	695	473	71	747	10	337	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	2.9	12.5	22.4	2.0	13.7	0.3	12.4	0.0	4.2	1.0	0.0	9.8
Cycle Q Clear(g_c), s	2.9	12.5	22.4	2.0	13.7	0.3	12.4	0.0	4.2	1.0	0.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	334	1364	599	286	1353	602	452	0	528	339	0	271
V/C Ratio(X)	0.31	0.51	0.79	0.25	0.55	0.02	0.75	0.00	0.22	0.08	0.00	0.77
Avail Cap(c_a), veh/h	386	1364	599	328	1353	602	522	0	965	397	0	694
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.8	20.0	23.1	15.6	20.7	16.5	22.5	0.0	21.7	28.3	0.0	33.9
Incr Delay (d2), s/veh	0.5	1.4	10.2	0.4	1.6	0.1	5.0	0.0	0.2	0.1	0.0	4.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	5.2	9.7	0.8	5.7	0.1	5.5	0.0	1.6	0.4	0.0	4.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	21.4	33.3	16.0	22.3	16.6	27.5	0.0	21.9	28.4	0.0	38.6
LnGrp LOS	В	С	С	В	С	В	С	A	С	С	A	D
Approach Vol, veh/h		1270			828			452			235	
Approach Delay, s/veh		25.4			21.7			26.0			37.5	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.0	37.0	7.3	30.7	9.5	36.5	19.7	18.3				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	7.0	31.0	18.0	34.0				
Max Q Clear Time (g_c+l1), s	4.0	24.4	3.0	6.2	4.9	15.7	14.4	11.8				
Green Ext Time (p_c), s	0.0	3.8	0.0	0.7	0.0	4.5	0.4	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			25.4									
HCM 6th LOS			С									

Int Delay, s/veh	5.2								
Movement	EBL	EBR	NBL	NBT	SBT	SBR			
Lane Configurations	Y		5	- 44	<b>**i</b>				
Traffic Vol, veh/h	8	116	134	0	993	40			
Future Vol, veh/h	8	116	134	0	993	40			
Conflicting Peds, #/hr	0	0	0	0	0	0			
Sign Control	Stop	Stop	Free	Free	Free	Free			
RT Channelized	-	None	-	None	-	None			
Storage Length	0	-	425	-	-	-			
Veh in Median Storage	e, # 0	-	-	0	0	-			
Grade, %	0	-	-	0	0	-			
Peak Hour Factor	81	81	92	92	90	90			
Heavy Vehicles, %	0	3	4	3	3	0			
Mvmt Flow	10	143	146	0	1103	44			

Major/Minor	Minor2	I	Major1	Ma	ijor2	
Conflicting Flow All	1417	574	1147	0	-	0
Stage 1	1125	-	-	-	-	-
Stage 2	292	-	-	-	-	-
Critical Hdwy	6.25	7.16	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.93	3.14	-	-	-
Pot Cap-1 Maneuver	159	394	327	-	-	-
Stage 1	210	-	-	-	-	-
Stage 2	712	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	. 88	394	327	-	-	-
Mov Cap-2 Maneuver	. 88	-	-	-	-	-
Stage 1	116	-	-	-	-	-
Stage 2	712	-	-	-	-	-

Approach	EB	NB	SB	
HCM Control Delay, s	25.9	24.6	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	327	- 322	-	-
HCM Lane V/C Ratio	0.445	- 0.475	-	-
HCM Control Delay (s)	24.6	- 25.9	-	-
HCM Lane LOS	С	- D	-	-
HCM 95th %tile Q(veh)	2.2	- 2.4	-	-

#### Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	23	16	18	39	23	77	11	287	67	76	414	34
Future Vol, veh/h	23	16	18	39	23	77	11	287	67	76	414	34
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	77	77	77	85	85	85	94	94	94	93	93	93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	305	71	82	445	37

Major/Minor	Minor2		Ν	Minor1		ľ	Major1			Major2			
Conflicting Flow All	1056	1030	466	1015	1013	343	484	0	0	376	0	0	
Stage 1	630	630	-	365	365	-	-	-	-	-	-	-	
Stage 2	426	400	-	650	648	-	-	-	-	-	-	-	
Critical Hdwy	7.1	6.5	6.2	7.1	6.56	6.2	4.1	-	-	4.1	-	-	
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.56	-	-	-	-	-	-	-	
Follow-up Hdwy	3.5	4	3.3	3.5	4.054	3.3	2.2	-	-	2.2	-	-	
Pot Cap-1 Maneuver	205	235	601	219	235	704	1089	-	-	1194	-	-	
Stage 1	473	478	-	658	616	-	-	-	-	-	-	-	
Stage 2	610	605	-	461	460	-	-	-	-	-	-	-	
Platoon blocked, %								-	-		-	-	
Mov Cap-1 Maneuver	148	210	600	179	210	703	1087	-	-	1194	-	-	
Mov Cap-2 Maneuver	148	210	-	179	210	-	-	-	-	-	-	-	
Stage 1	465	432	-	649	607	-	-	-	-	-	-	-	
Stage 2	500	597	-	382	416	-	-	-	-	-	-	-	

Approach	EB	WB	NB	SB	
HCM Control Delay, s	29.8	27.7	0.3	1.2	
HCM LOS	D	D			

Minor Lane/Major Mvmt	NBL	NBT	NBR E	BLn1V	VBLn1	SBL	SBT	SBR
Capacity (veh/h)	1087	-	-	218	318	1194	-	-
HCM Lane V/C Ratio	0.011	-	-	0.34	0.514	0.068	-	-
HCM Control Delay (s)	8.3	0	-	29.8	27.7	8.2	0	-
HCM Lane LOS	А	А	-	D	D	Α	Α	-
HCM 95th %tile Q(veh)	0	-	-	1.4	2.8	0.2	-	-

	٠	-	7	*	•	*	1	t	1	1	ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	ţ,										
Traffic Volume (veh/h)	108	458	61	95	390	39	46	246	48	93	314	92
Future Volume (veh/h)	108	458	61	95	390	39	46	246	48	93	314	92
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900
Adj Flow Rate, veh/h	114	482	64	100	411	41	50	267	52	98	331	97
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0
Cap, veh/h	308	557	74	237	585	58	292	490	95	370	455	133
Arrive On Green	0.06	0.34	0.34	0.06	0.34	0.34	0.06	0.32	0.32	0.06	0.32	0.32
Sat Flow, veh/h	1795	1616	215	1795	1699	169	1810	1520	296	1795	1411	413
Grp Volume(v), veh/h	114	0	546	100	0	452	50	0	319	98	0	428
Grp Sat Flow(s),veh/h/ln	1795	0	1831	1795	0	1869	1810	0	1816	1795	0	1824
Q Serve(g_s), s	3.7	0.0	25.1	3.2	0.0	18.8	1.6	0.0	13.0	3.2	0.0	18.7
Cycle Q Clear(g_c), s	3.7	0.0	25.1	3.2	0.0	18.8	1.6	0.0	13.0	3.2	0.0	18.7
Prop In Lane	1.00		0.12	1.00		0.09	1.00		0.16	1.00		0.23
Lane Grp Cap(c), veh/h	308	0	631	237	0	644	292	0	585	370	0	588
V/C Ratio(X)	0.37	0.00	0.87	0.42	0.00	0.70	0.17	0.00	0.55	0.27	0.00	0.73
Avail Cap(c_a), veh/h	308	0	631	237	0	644	292	0	585	370	0	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.5	0.0	27.6	21.1	0.0	25.5	20.0	0.0	25.1	19.5	0.0	27.0
Incr Delay (d2), s/veh	3.4	0.0	14.8	5.4	0.0	6.3	1.3	0.0	3.6	1.7	0.0	7.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.7	0.0	12.9	1.6	0.0	9.0	0.7	0.0	5.9	1.5	0.0	9.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	0.0	42.4	26.5	0.0	31.8	21.2	0.0	28.7	21.2	0.0	34.7
LnGrp LOS	С	А	D	С	А	С	С	А	С	С	А	С
Approach Vol, veh/h		660			552			369			526	
Approach Delay, s/veh		39.0			30.9			27.7			32.2	
Approach LOS		D			С			С			С	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	10.0	34.0	10.0	36.0	10.0	34.0	10.0	36.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	29.0	5.0	31.0	5.0	29.0	5.0	31.0				
Max Q Clear Time (g_c+I1), s	5.2	15.0	5.2	27.1	3.6	20.7	5.7	20.8				
Green Ext Time (p_c), s	0.0	1.5	0.0	1.3	0.0	1.6	0.0	2.0				
Intersection Summary												
HCM 6th Ctrl Delay			33.2									
HCM 6th LOS			С									

#### Intersection

Maxamant	EDI	ГРТ					NDI	NDT		CDI	ODT	CDD
wovement	EBL	EBI	EBK	VVBL	VVBI	WBR	INBL	INBT	INBR	SBL	SBI	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	20	613	16	4	527	9	1	4	14	0	2	43
Future Vol, veh/h	20	613	16	4	527	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None									
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	639	17	4	543	9	1	6	21	0	3	60

Major/Minor	Major1		N	/lajor2		I	Minor1		1	Minor2			
Conflicting Flow All	554	0	0	657	0	0	1278	1253	649	1261	1257	550	
Stage 1	-	-	-	-	-	-	691	691	-	558	558	-	
Stage 2	-	-	-	-	-	-	587	562	-	703	699	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	1026	-	-	940	-	-	144	174	461	148	173	529	
Stage 1	-	-	-	-	-	-	438	449	-	518	515	-	
Stage 2	-	-	-	-	-	-	499	513	-	431	445	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1024	-	-	939	-	-	122	167	461	133	166	528	
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	167	-	133	166	-	
Stage 1	-	-	-	-	-	-	424	434	-	500	511	-	
Stage 2	-	-	-	-	-	-	438	509	-	393	430	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.1			18			13.6			
HCM LOS							С			В			
Minor Lano/Major Mur	<b>.</b> +		EDI	EDT	EDD	\//DI	\ <b>\</b> /DT	\//DD					

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR S	SBLn1	
Capacity (veh/h)	304	1024	-	-	939	-	-	481	
HCM Lane V/C Ratio	0.092	0.02	-	-	0.004	-	-	0.13	
HCM Control Delay (s)	18	8.6	0	-	8.9	0	-	13.6	
HCM Lane LOS	С	А	А	-	А	А	-	В	
HCM 95th %tile Q(veh)	0.3	0.1	-	-	0	-	-	0.4	

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2042 AM - With Project 06/28/2022

	٠	-	7	-	+	*	1	Ť	1	1	Ŧ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>†</b> †	1	7	ţ,		7	ħ	
Traffic Volume (veh/h)	88	606	387	60	929	12	248	61	71	26	70	108
Future Volume (veh/h)	88	606	387	60	929	12	248	61	71	26	70	108
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.98	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1826	1841	1826	1856	1900	1841	1856	1841	1900	1885	1870
Adj Flow Rate, veh/h	99	681	435	65	1010	13	276	68	79	28	75	116
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.90	0.90	0.90	0.93	0.93	0.93
Percent Heavy Veh, %	3	5	4	5	3	0	4	3	4	0	1	2
Cap, veh/h	275	1428	641	302	1425	636	394	209	243	328	99	154
Arrive On Green	0.05	0.41	0.41	0.05	0.40	0.40	0.15	0.27	0.27	0.03	0.15	0.15
Sat Flow, veh/h	1767	3469	1558	1739	3526	1575	1753	782	909	1810	666	1031
Grp Volume(v), veh/h	99	681	435	65	1010	13	276	0	147	28	0	191
Grp Sat Flow(s),veh/h/ln	1767	1735	1558	1739	1763	1575	1753	0	1691	1810	0	1697
Q Serve(g_s), s	2.6	11.7	18.6	1.7	19.5	0.4	10.4	0.0	5.7	1.1	0.0	8.8
Cycle Q Clear(g_c), s	2.6	11.7	18.6	1.7	19.5	0.4	10.4	0.0	5.7	1.1	0.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.54	1.00		0.61
Lane Grp Cap(c), veh/h	275	1428	641	302	1425	636	394	0	452	328	0	253
V/C Ratio(X)	0.36	0.48	0.68	0.21	0.71	0.02	0.70	0.00	0.33	0.09	0.00	0.75
Avail Cap(c_a), veh/h	287	1428	641	348	1425	636	394	0	973	387	0	832
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.5	17.6	19.6	13.6	20.3	14.6	23.3	0.0	24.0	28.0	0.0	33.3
Incr Delay (d2), s/veh	0.8	1.1	5.7	0.4	3.0	0.1	5.4	0.0	0.4	0.1	0.0	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/In	1.0	4.6	7.4	0.7	8.0	0.2	4.6	0.0	2.2	0.5	0.0	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.3	18.7	25.3	14.0	23.3	14.7	28.7	0.0	24.4	28.1	0.0	37.8
LnGrp LOS	В	В	С	В	С	В	С	Α	С	С	Α	D
Approach Vol, veh/h		1215			1088			423			219	
Approach Delay, s/veh		20.9			22.7			27.2			36.6	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.9	38.6	7.4	26.8	9.5	38.0	17.0	17.2				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	6.0	32.0	5.0	47.0	5.0	33.0	12.0	40.0				
Max Q Clear Time (g_c+I1), s	3.7	20.6	3.1	7.7	4.6	21.5	12.4	10.8				
Green Ext Time (p_c), s	0.0	4.8	0.0	0.9	0.0	5.3	0.0	1.3				
Intersection Summary												
HCM 6th Ctrl Delay			23.6									
HCM 6th LOS			С									

Int Delay, s/veh	9.5						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	Y		٦	- 11	<b>*††</b>		
Traffic Vol, veh/h	13	67	220	0	850	57	
Future Vol, veh/h	13	67	220	0	850	57	
Conflicting Peds, #/hr	0	0	2	0	0	2	
Sign Control	Stop	Stop	Free	Free	Free	Free	
RT Channelized	-	None	-	None	-	None	
Storage Length	0	-	425	-	-	-	
Veh in Median Storage	, # 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	86	86	82	82	92	92	
Heavy Vehicles, %	0	6	4	0	9	23	
Mvmt Flow	15	78	268	0	924	62	

Major/Minor	Minor2	Ν	/lajor1	Maj	or2	
Conflicting Flow All	1493	495	988	0	-	0
Stage 1	957	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Critical Hdwy	6.25	7.22	5.38	-	-	-
Critical Hdwy Stg 1	6.6	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.65	3.96	3.14	-	-	-
Pot Cap-1 Maneuver	143	437	391	-	-	-
Stage 1	267	-	-	-	-	-
Stage 2	539	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	45	436	390	-	-	-
Mov Cap-2 Maneuver	45	-	-	-	-	-
Stage 1	83	-	-	-	-	-
Stage 2	538	-	-	-	-	-
Annroach	FB		NR		SB	

Approach	EB	NB	SB	
HCM Control Delay, s	44.2	32.3	0	
HCM LOS	Е			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	390	- 181	-	-
HCM Lane V/C Ratio	0.688	- 0.514	-	-
HCM Control Delay (s)	32.3	- 44.2	-	-
HCM Lane LOS	D	- E	-	-
HCM 95th %tile Q(veh)	5	- 2.6	-	-

Intersection Delay, s/veh Intersection LOS

```
27.5
```

D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$			\$			\$	
Traffic Vol, veh/h	29	23	18	31	40	77	24	264	76	49	399	43
Future Vol, veh/h	29	23	18	31	40	77	24	264	76	49	399	43
Peak Hour Factor	0.73	0.73	0.73	0.79	0.79	0.79	0.85	0.85	0.85	0.87	0.87	0.87
Heavy Vehicles, %	11	17	0	9	8	7	0	4	1	4	4	0
Mvmt Flow	40	32	25	39	51	97	28	311	89	56	459	49
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	12.3			13.6			20.8			39.8		
HCM LOS	В			В			С			Е		

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	7%	41%	21%	10%
Vol Thru, %	73%	33%	27%	81%
Vol Right, %	21%	26%	52%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	364	70	148	491
LT Vol	24	29	31	49
Through Vol	264	23	40	399
RT Vol	76	18	77	43
Lane Flow Rate	428	96	187	564
Geometry Grp	1	1	1	1
Degree of Util (X)	0.689	0.197	0.355	0.902
Departure Headway (Hd)	5.795	7.383	6.818	5.756
Convergence, Y/N	Yes	Yes	Yes	Yes
Сар	621	484	526	632
Service Time	3.848	5.462	4.887	3.756
HCM Lane V/C Ratio	0.689	0.198	0.356	0.892
HCM Control Delay	20.8	12.3	13.6	39.8
HCM Lane LOS	С	В	В	E
HCM 95th-tile Q	5.4	0.7	1.6	11.2

# メーシュー イイ インシナイ

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	٦	1	1	٦	1	1	٦	Þ		٦	Þ	
Traffic Volume (veh/h)	96	383	32	25	512	25	72	325	49	75	295	74
Future Volume (veh/h)	96	383	32	25	512	25	72	325	49	75	295	74
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	h	No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1856	1900	1841	1870	1841	1811	1826	1841	1781	1870	1796
Adj Flow Rate, veh/h	107	426	36	29	602	29	87	392	59	86	339	85
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.83	0.83	0.83	0.87	0.87	0.87
Percent Heavy Veh, %	2	3	0	4	2	4	6	5	4	8	2	7
Cap, veh/h	218	660	572	327	665	554	269	482	73	244	449	113
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31
Sat Flow, veh/h	1781	1856	1608	1753	1870	1558	1725	1551	233	1697	1443	362
Grp Volume(v), veh/h	107	426	36	29	602	29	87	0	451	86	0	424
Grp Sat Flow(s),veh/h/In	1781	1856	1608	1753	1870	1558	1725	0	1784	1697	0	1805
Q Serve(g_s), s	3.4	17.3	1.3	0.9	27.5	1.1	3.0	0.0	21.0	3.0	0.0	19.0
Cycle Q Clear(g_c), s	3.4	17.3	1.3	0.9	27.5	1.1	3.0	0.0	21.0	3.0	0.0	19.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.13	1.00		0.20
Lane Grp Cap(c), veh/h	218	660	572	327	665	554	269	0	555	244	0	562
V/C Ratio(X)	0.49	0.65	0.06	0.09	0.91	0.05	0.32	0.00	0.81	0.35	0.00	0.75
Avail Cap(c_a), veh/h	218	660	572	327	665	554	269	0	555	244	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	n 21.5	24.3	19.1	17.6	27.6	19.0	21.2	0.0	28.6	21.7	0.0	27.9
Incr Delay (d2), s/veh	7.7	4.8	0.2	0.5	18.1	0.2	3.2	0.0	12.3	4.0	0.0	9.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh	/In1.8	8.1	0.5	0.4	14.9	0.4	1.4	0.0	10.4	1.4	0.0	9.2
Unsig. Movement Delay	, s/veh											
LnGrp Delay(d),s/veh	29.1	29.1	19.3	18.1	45.7	19.2	24.4	0.0	40.9	25.7	0.0	37.0
LnGrp LOS	С	С	В	В	D	В	С	А	D	С	А	D
Approach Vol, veh/h		569			660			538			510	
Approach Delay, s/veh		28.5			43.3			38.2			35.1	
Approach LOS		С			D			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc)	\$0 0	33.0	10.0	37.0	10.0	33.0	10.0	37.0				
Change Period (Y+Rc)	, 50.0 s 5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gm	3 0.0 av 5 @	28.0	5.0	32.0	5.0	28.0	5.0	32.0				
Max O Clear Time (or ca	⊔.143.0e	23.0	2.0	10 3	5.0	20.0	5.0	29.5				
Green Ext Time (n_c)	0.0	1.2	0.0	2.2	0.0	21.0 1 4	0.0	10				
$(p_c), s$	0.0	1.2	0.0	2.2	0.0	1.4	0.0	1.0				
Intersection Summary												
HCM 6th Ctrl Delay			36.6									
HCM 6th LOS			D									

#### Intersection

Movement E	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		\$			4			\$			\$	
Traffic Vol, veh/h	24	517	5	5	647	7	8	1	8	6	3	34
Future Vol, veh/h	24	517	5	5	647	7	8	1	8	6	3	34
Conflicting Peds, #/hr	2	0	3	3	0	2	0	0	0	0	0	0
Sign Control F	ree	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	85	85	85	53	53	53	73	73	73
Heavy Vehicles, %	0	2	0	0	3	0	0	0	0	0	0	0
Mvmt Flow	27	588	6	6	761	8	15	2	15	8	4	47

Major/Minor	Major1		Ν	lajor2		Ν	/linor1		N	/linor2			
Conflicting Flow All	771	0	0	597	0	0	1451	1431	594	1433	1430	767	
Stage 1	-	-	-	-	-	-	648	648	-	779	779	-	
Stage 2	-	-	-	-	-	-	803	783	-	654	651	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.2	7.1	6.5	6.2	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.3	3.5	4	3.3	
Pot Cap-1 Maneuver	853	-	-	989	-	-	110	136	509	113	136	405	
Stage 1	-	-	-	-	-	-	462	469	-	392	409	-	
Stage 2	-	-	-	-	-	-	380	407	-	459	468	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	851	-	-	986	-	-	91	128	508	104	128	404	
Mov Cap-2 Maneuver	-	-	-	-	-	-	91	128	-	104	128	-	
Stage 1	-	-	-	-	-	-	439	446	-	373	404	-	
Stage 2	-	-	-	-	-	-	329	402	-	423	445	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.4			0.1			34.7			22.9			
HCM LOS							D			С			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	153	851	-	-	986	-	-	260
HCM Lane V/C Ratio	0.21	0.032	-	-	0.006	-	-	0.227
HCM Control Delay (s)	34.7	9.4	0	-	8.7	0	-	22.9
HCM Lane LOS	D	Α	А	-	А	А	-	С
HCM 95th %tile Q(veh)	0.8	0.1	-	-	0	-	-	0.8

HCM 6th Signalized Intersection Summary 1: Manono Street/Lihiwai Street & Route 19 (Mamalahoa Highway)

2042 PM - With Project 06/28/2022

	٠	-	7	*	+	*	1	1	1	1	ŧ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>†</b> †	1	7	<b>^</b>	1	٢	ef .		7	ħ	
Traffic Volume (veh/h)	96	742	505	65	780	9	321	54	46	21	70	97
Future Volume (veh/h)	96	742	505	65	780	9	321	54	46	21	70	97
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.98	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1900	1900	1900	1900	1900	1870	1870	1900	1900	1885
Adj Flow Rate, veh/h	102	789	537	71	848	10	369	62	53	26	88	121
Peak Hour Factor	0.94	0.94	0.94	0.92	0.92	0.92	0.87	0.87	0.87	0.80	0.80	0.80
Percent Heavy Veh, %	1	1	0	0	0	0	0	2	2	0	0	1
Cap, veh/h	294	1354	595	253	1344	598	472	297	254	333	113	155
Arrive On Green	0.05	0.38	0.38	0.05	0.37	0.37	0.19	0.32	0.32	0.03	0.16	0.16
Sat Flow, veh/h	1795	3582	1572	1810	3610	1606	1810	930	795	1810	723	994
Grp Volume(v), veh/h	102	789	537	71	848	10	369	0	115	26	0	209
Grp Sat Flow(s),veh/h/ln	1795	1791	1572	1810	1805	1606	1810	0	1725	1810	0	1717
Q Serve(g_s), s	3.0	15.3	28.2	2.1	16.8	0.3	14.1	0.0	4.2	1.0	0.0	10.2
Cycle Q Clear(g_c), s	3.0	15.3	28.2	2.1	16.8	0.3	14.1	0.0	4.2	1.0	0.0	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.46	1.00		0.58
Lane Grp Cap(c), veh/h	294	1354	595	253	1344	598	472	0	550	333	0	268
V/C Ratio(X)	0.35	0.58	0.90	0.28	0.63	0.02	0.78	0.00	0.21	0.08	0.00	0.78
Avail Cap(c_a), veh/h	322	1354	595	271	1344	598	543	0	929	388	0	629
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	17.2	21.6	25.6	16.8	22.5	17.3	23.0	0.0	21.7	29.6	0.0	35.4
Incr Delay (d2), s/veh	0.7	1.8	19.5	0.6	2.3	0.1	6.4	0.0	0.2	0.1	0.0	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	6.4	13.3	0.9	7.1	0.1	6.5	0.0	1.7	0.5	0.0	4.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.9	23.5	45.1	17.4	24.7	17.4	29.4	0.0	21.9	29.7	0.0	40.3
LnGrp LOS	В	С	D	В	С	В	С	А	С	С	Α	D
Approach Vol, veh/h		1428			929			484			235	
Approach Delay, s/veh		31.2			24.1			27.6			39.2	
Approach LOS		С			С			С			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	9.1	38.0	7.3	32.8	9.6	37.5	21.6	18.6				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	5.0	33.0	5.0	47.0	6.0	32.0	20.0	32.0				
Max Q Clear Time (g_c+l1), s	4.1	30.2	3.0	6.2	5.0	18.8	16.1	12.2				
Green Ext Time (p_c), s	0.0	1.9	0.0	0.7	0.0	4.8	0.4	1.2				
Intersection Summary												
HCM 6th Ctrl Delay			29.1									
HCM 6th LOS			С									

Int Delay, s/veh 6.2 EBL EBR NBL NBT SBT SBR Movement Y **\*\* \*\*\*** 0 1127 Lane Configurations ٦ 8 Traffic Vol, veh/h 116 134 40 Future Vol, veh/h 8 116 134 0 1127 40 Conflicting Peds, #/hr 0 0 0 0 0 0 Sign Control Stop Stop Free Free Free Free RT Channelized -None -None -None Storage Length 0 425 ----Veh in Median Storage, # 0 --0 0 -Grade, % 0 0 0 ---Peak Hour Factor 81 90 90 81 92 92 Heavy Vehicles, % 0 3 4 3 3 0 Mvmt Flow 10 143 146 0 1252 44

Major/Minor	Minor2	N	Major1	Ma	jor2		
Conflicting Flow All	1566	648	1296	0	-	0	
Stage 1	1274	-	-	-	-	-	
Stage 2	292	-	-	-	-	-	
Critical Hdwy	6.25	7.16	5.38	-	-	-	
Critical Hdwy Stg 1	6.6	-	-	-	-	-	
Critical Hdwy Stg 2	5.8	-	-	-	-	-	
Follow-up Hdwy	3.65	3.93	3.14	-	-	-	
Pot Cap-1 Maneuver	130	352	276	-	-	-	
Stage 1	170	-	-	-	-	-	
Stage 2	712	-	-	-	-	-	
Platoon blocked, %				-	-	-	
Mov Cap-1 Maneuver	· 61	352	276	-	-	-	
Mov Cap-2 Maneuver	· 61	-	-	-	-	-	
Stage 1	80	-	-	-	-	-	
Stage 2	712	-	-	-	-	-	
Anna a ah	ED				00		

Approach	EB	NB	SB	
HCM Control Delay, s	34.7	31.7	0	
HCM LOS	D			

Minor Lane/Major Mvmt	NBL	NBT EBLn1	SBT	SBR
Capacity (veh/h)	276	- 269	-	-
HCM Lane V/C Ratio	0.528	- 0.569	-	-
HCM Control Delay (s)	31.7	- 34.7	-	-
HCM Lane LOS	D	- D	-	-
HCM 95th %tile Q(veh)	2.9	- 3.2	-	-

Intersection Delay, s/veh Intersection LOS

29.8

D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$			\$			\$	
Traffic Vol, veh/h	23	16	18	39	23	77	11	325	67	76	474	34
Future Vol, veh/h	23	16	18	39	23	77	11	325	67	76	474	34
Peak Hour Factor	0.77	0.77	0.77	0.85	0.85	0.85	0.94	0.94	0.94	0.93	0.93	0.93
Heavy Vehicles, %	0	0	0	0	6	0	0	1	0	0	1	0
Mvmt Flow	30	21	23	46	27	91	12	346	71	82	510	37
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	11.4			12.5			19.5			43.6		
HCM LOS	В			В			С			E		

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	3%	40%	28%	13%
Vol Thru, %	81%	28%	17%	81%
Vol Right, %	17%	32%	55%	6%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	403	57	139	584
LT Vol	11	23	39	76
Through Vol	325	16	23	474
RT Vol	67	18	77	34
Lane Flow Rate	429	74	164	628
Geometry Grp	1	1	1	1
Degree of Util (X)	0.673	0.146	0.301	0.933
Departure Headway (Hd)	5.648	7.112	6.616	5.457
Convergence, Y/N	Yes	Yes	Yes	Yes
Сар	643	505	545	672
Service Time	3.648	5.145	4.642	3.457
HCM Lane V/C Ratio	0.667	0.147	0.301	0.935
HCM Control Delay	19.5	11.4	12.5	43.6
HCM Lane LOS	С	В	В	E
HCM 95th-tile Q	5.2	0.5	1.3	12.7

# メーシュー イイ インシナイ

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	٦	•	1	1	<b>†</b>	1	1	1.		1	Þ		
Traffic Volume (veh/h)	108	541	61	95	442	39	46	279	48	93	374	92	
Future Volume (veh/h)	108	541	61	95	442	39	46	279	48	93	374	92	
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Work Zone On Approac	h	No			No			No			No		
Adj Sat Flow, veh/h/ln	1885	1870	1900	1885	1900	1900	1900	1870	1841	1885	1900	1900	
Adj Flow Rate, veh/h	114	569	64	100	465	41	50	303	52	98	394	97	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.95	0.95	0.95	
Percent Heavy Veh, %	1	2	0	1	0	0	0	2	4	1	0	0	
Cap, veh/h	312	665	570	239	676	570	235	484	83	329	458	113	
Arrive On Green	0.06	0.36	0.36	0.06	0.36	0.36	0.06	0.31	0.31	0.06	0.31	0.31	
Sat Flow, veh/h	1795	1870	<u> 16</u> 03	1795	1900	1603	1810	15 <u>5</u> 5	267	1795	1471	362	
Grp Volume(v), veh/h	114	569	64	100	465	41	50	0	355	98	0	491	
Grp Sat Flow(s),veh/h/lr	า1795	1870	1603	1795	1900	1603	1810	0	1821	1795	0	1833	
Q Serve(g_s), s	3.6	25.4	2.4	3.1	18.8	1.5	1.6	0.0	15.0	3.3	0.0	22.7	
Cycle Q Clear(g_c), s	3.6	25.4	2.4	3.1	18.8	1.5	1.6	0.0	15.0	3.3	0.0	22.7	
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.15	1.00		0.20	
Lane Grp Cap(c), veh/h	312	665	570	239	676	570	235	0	567	329	0	570	
V/C Ratio(X)	0.37	0.86	0.11	0.42	0.69	0.07	0.21	0.00	0.63	0.30	0.00	0.86	
Avail Cap(c a), veh/h	312	665	570	239	676	570	235	0	567	329	0	570	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	
Uniform Delay (d), s/vel	า 18.9	26.9	19.5	20.6	24.7	19.2	21.6	0.0	26.5	20.5	0.0	29.2	
Incr Delay (d2), s/veh	3.3	13.3	0.4	5.3	5.7	0.2	2.1	0.0	5.2	2.3	0.0	15.6	
Initial Q Delay(d3),s/veh	n 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh	n/In1.7	13.1	0.9	1.6	9.1	0.6	0.8	0.0	7.0	1.5	0.0	11.9	
Unsig. Movement Delay	, s/veh												
LnGrp Delay(d),s/veh	22.2	40.2	19.9	25.9	30.4	19.4	23.6	0.0	31.7	22.8	0.0	44.8	
LnGrp LOS	С	D	В	С	С	В	С	А	С	С	А	D	
Approach Vol. veh/h		747			606			405			589		
Approach Delay, s/veh		35.7			28.9			30.7			41.1		
Approach LOS		D			С			С			D		
Timor Assigned Dhe	1	0	2	1	E	6	7	0					
Timer - Assigned PAS	40.0	22.0	10.0	27.0	10.0	22.0	10.0	0	_			_	
Pris Duration (G+Y+Rc)	, <b>S</b> U.U	33.0	10.0	37.0	10.0	33.0	10.0	37.0					
Change Period (Y+Rc),	\$ 5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0					
Max Green Setting (Gm	12X),.19	28.0	5.0	32.0	5.0	28.0	5.0	32.0					
iviax Q Clear Time (g_c	+115),35	17.0	5.1	27.4	3.6	24.7	5.6	20.8					
Green Ext Time (p_c), s	5 0.0	1.5	0.0	1.6	0.0	1.0	0.0	2.2					
Intersection Summary													
HCM 6th Ctrl Delay			34.4										
HCM 6th LOS			С										
1.2

#### Intersection

Int Delay, s/veh

Mayamant		ГРТ						NDT			ODT	CDD
Movement	EBL	ERI	EBK	WBL	VVBI	WBR	NBL	INR I	NBK	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	20	696	16	4	579	9	1	4	14	0	2	43
Future Vol, veh/h	20	696	16	4	579	9	1	4	14	0	2	43
Conflicting Peds, #/hr	2	0	1	1	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	4 -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	96	96	96	97	97	97	68	68	68	72	72	72
Heavy Vehicles, %	0	1	6	0	0	0	0	0	7	0	0	5
Mvmt Flow	21	725	17	4	597	9	1	6	21	0	3	60

Major/Minor	Major1		Ν	lajor2		N	/linor1		I	Minor2			
Conflicting Flow All	608	0	0	743	0	0	1418	1393	735	1401	1397	604	
Stage 1	-	-	-	-	-	-	777	777	-	612	612	-	
Stage 2	-	-	-	-	-	-	641	616	-	789	785	-	
Critical Hdwy	4.1	-	-	4.1	-	-	7.1	6.5	6.27	7.1	6.5	6.25	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-	
Follow-up Hdwy	2.2	-	-	2.2	-	-	3.5	4	3.363	3.5	4	3.345	
Pot Cap-1 Maneuver	980	-	-	873	-	-	116	143	411	119	142	493	
Stage 1	-	-	-	-	-	-	393	410	-	484	487	-	
Stage 2	-	-	-	-	-	-	466	485	-	387	407	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	978	-	-	872	-	-	97	136	411	105	135	492	
Mov Cap-2 Maneuver	-	-	-	-	-	-	97	136	-	105	135	-	
Stage 1	-	-	-	-	-	-	378	394	-	465	483	-	
Stage 2	-	-	-	-	-	-	404	481	-	349	392	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.2			0.1			20.6			14.5			
HCMLOS							С			В			

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR \$	SBLn1
Capacity (veh/h)	258	978	-	-	872	-	-	440
HCM Lane V/C Ratio	0.108	0.021	-	-	0.005	-	-	0.142
HCM Control Delay (s)	20.6	8.8	0	-	9.1	0	-	14.5
HCM Lane LOS	С	А	А	-	А	А	-	В
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.5

Appendix G – Analysis Report Future With Mitigation



### **Roundabout Capacity Analysis**

HCM 6th Edition Methodology



HCM 6th Edition Roundabout Analysis Individual Lane Results						
Approach:	Northbound	Southbound	Eastbound	Westbound		
Street Name:	Manono Street	Manono Street	Piilani Street	Piilani Street		
Configuration:	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)		
Right Turn Bypass:	No Separate Bypass	No Separate Bypass	No Separate Bypass	No Separate Bypass		
Peak Hour Factor:	0.85	0.87	0.73	0.79		
% Bicycles:	0%	0%	0%	0%		
% Heavy Vehicles:	4%	4%	7%	5%		
Adjusted Entry Flow:	428	564	97	187		
Capacity:	1154	1172	718	879		
v/c Ratio:	0.37	0.48	0.14	0.21		
Delay (seconds/veh):	7	8	6	6		
Level of Service (LOS):	А	A	A	A		
95th %ile Queue (veh):	1.7	2.7	0.5	0.8		
Approach Delay:	7 Seconds/Vehicle	8 Seconds/Vehicle	6 Seconds/Vehicle	6 Seconds/Vehicle		
Approach LOS:	A	A	A	A		
Exit Lanes Required:	Minimum 1 Exit Lane					

HCM 6th Edition Roundabout Analysis Overall Intersection Results

Average Control Delay is 7 seconds and LOS A.

All Approach Lanes have a v/c ratio under 0.85.

Spack Academy is part of the Spack Enterprise family of companies













### **Roundabout Capacity Analysis**

HCM 6th Edition Methodology



HCM 6th Edition Roundabout Analysis Individual Lane Results						
Approach:	Northbound	Southbound	Eastbound	Westbound		
Street Name:	Manono Street	Manono Street	Piilani Street	Piilani Street		
Configuration:	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)	Left/Thru/Right (1 lane)		
Right Turn Bypass:	No Separate Bypass	No Separate Bypass	No Separate Bypass	No Separate Bypass		
Peak Hour Factor:	0.94	0.93	0.77	0.85		
% Bicycles:	0%	0%	0%	0%		
% Heavy Vehicles:	1%	0%	0%	1%		
Adjusted Entry Flow:	428	628	74	164		
Capacity:	1198	1260	718	920		
v/c Ratio:	0.36	0.50	0.10	0.18		
Delay (seconds/veh):	6	8	6	6		
Level of Service (LOS):	А	A	A	A		
95th %ile Queue (veh):	1.6	2.9	0.3	0.6		
Approach Delay:	6 Seconds/Vehicle	8 Seconds/Vehicle	6 Seconds/Vehicle	6 Seconds/Vehicle		
Approach LOS:	A	A	A	A		
Exit Lanes Required:	Minimum 1 Exit Lane					

HCM 6th Edition Roundabout Analysis Overall Intersection Results

Average Control Delay is 7 seconds and LOS A.

All Approach Lanes have a v/c ratio under 0.85.

Spack Academy is part of the Spack Enterprise family of companies











### DRAFT ENVIRONMENTAL ASSESSMENT

Hawaiian Kingdom Brands Kanaka Beverage Plant and Café

**Appendix E Comments in Response to Early Consultation**  Mitchell D. Roth Mayor

Lee E. Lord Managing Director

West Hawaiʻi Office 74-5044 Ane Keohokālole Hwy Kailua-Kona, Hawaiʻi 96740 Phone (808) 323-4770 Fax (808) 327-3563

December 9, 2022

John Pipan c/o Land Planning Hawaii, LLC 194 Wiwoʻole St. Hilo, HI 96720

Dear Mr. Pipan,

SUBJECT:Review of Draft Environmental Assessment (DEA) for the Hawaiian Kingdom<br/>Brands Kanaka Beverage Plant and Café (PL-INT-2022-001968)Applicant:Hawaiian Kingdom Brands, LLCLocation:Waiākea House lots, South Hilo District, Island of Hawai'iTMK:(3) 2-2-033:011

The County of Hawai'i Planning Department has reviewed the subject Draft Environmental Assessment (DEA) for the Hawaiian Kingdom Brands Kanaka Beverage Plant and Café. According to our information, the entire parcel is located within the State Land Use (SLU) Urban District and is zoned Limited Industrial-20,000 square feet (sf.) (ML-20) by the County of Hawai'i. According to the General Plan LUPAG map, the site is designated as Industrial.

The Draft Environmental Assessment (DEA) is being prepared in accordance with Hawai'i Revised Statutes (HRS) Section 343-5 for the proposed project. Based on the information provided, the applicant is proposing to construct a beverage processing building, café and drive-thru on the subject parcel, which includes:

- 30,000 sf. warehouse/manufacturing building.
- Potable well, depth -1,036 ft. mean sea level.
- 1,800 sf. café.
- Drive-thru for café.
- 3 driveways.
- 81 parking stalls.
- Extension of county sewer.
- Extension of county roadway.



### **County of Hawai'i** PLANNING DEPARTMENT

Zendo Kern Director

Jeffrey W. Darrow Deputy Director

East Hawai<sup>4</sup>i Office 101 Pauahi Street, Suite 3 Hilo, Hawai<sup>4</sup>i 96720 Phone (808) 961-8288 Fax (808) 961-8742 John Pipan c/o Land Planning Hawaii, LLC December 9, 2022 Page 2

The applicant states that the purpose of the proposed project is to provide various employment opportunities for residents (up to 100 job opportunities when fully operational), utilize local foods and other agricultural resources, and will provide locally made consumer products to the rapidly growing population in the Hilo area.

### Based on our review of the DEA and related documents (appendices A-D) the Planning Department provides the following comments:

- 1) The submitted TIAR did not incorporate the upcoming Island Naturals commercial building project which was approved under SMA Use Permit No. 21-000079; note that the project did not require an EA/EIS. The project is located at the intersection of Mililani and Kekūanaōʻa Street (Intersection No. 4 as noted in Figure 47 of the DEA)
  - a. We request that the applicant include this proposed project and its future traffic impacts into the "Upcoming Planned Project" Section of the TIAR.
- 2) According to the DEA, County water will be provided to the property for onsite potable uses and will not be used for bottling uses; allowable use is 600 gallons per day (gpd) from an existing 5/8" meter. A potable water well, drilled to a depth of ~1,000 feet, will be used for the bottling and coffee product production.
  - a. What happens if the water from the confined aquifer is not up to Department of Health (DOH) standards?
  - b. If water is not up to DOH standards, will treatment of water be utilized before resale?
  - c. What if during testing the well does impact basal water sources? Is there an alternative plan?
- 3) Can the applicant obtain clarification from Commission on Water Resource Management (CWRM) that the water will be drawn from the confined aquifer, even though it will be considered to be from the Onomea Aquifer? If not, provide more clarity to the public that the resources available from the confined aquifer differ from the Onomea Aquifer.
  - a. Does CWRM recognize the Hawai'i Scientific Drilling Project (HSDP) as relevant and useful data to support the use of the confined aquifer?
- 4) Drainage was determined to flow from the subject parcel to the west. We would like to reiterate the Department of Land and Natural Resources (DLNR) Division of Aquatic Resources (DAR) comments regarding potential anchialine ponds on adjacent properties. If located, all stormwater and potential ground water discharges should be diverted well away from the pond or pool. Based on these resources and potential impacts, please discuss in more detail potential impacts from runoff moving into the Waiākea Fishpond and possible mitigation.
  - a. We recommend a draft Storm Water Pollution Prevention Plan (SWPPP) be included as part of the applicant's environmental review.

John Pipan c/o Land Planning Hawaii, LLC December 9, 2022 Page 3

- 5) We recommend specifically addressing each of the Sierra Club's comments received during the pre-DEA review. Those concerns, whether valid or not, will most likely be mimicked by the public. The applicant should provide evidence to each claim to support the project. This will also aid in preparing for the public hearing before the Windward Planning Commission.
- 6) Glass bottles are to be used for bottling purposes for both local and off-island markets; however, plastic may be used if glass supply is limited. The applicant should discuss the impacts on the SMA of use of plastic bottles more thoroughly than is discussed in Section 3.4 of the DEA due to previous community concerns regarding the global plastic waste crisis, and the impact of plastic waste here in Hawai'i.
- 7) Because of the proximity to the Waiākea Fishpond, state wetlands, and anchialine ponds, we recommend the applicant obtain a Jurisdictional Determination (JD) from the U.S. Army Corps of Engineers Honolulu District as part of the environmental review process.
- 8) A managing board will be created that is made up of native Hawaiians which will "uphold the integrity and established goals of the company" and support community events such as beach clean-ups. It was stated that part of the project mission is to be a visible reminder that the Hawaiian Kingdom exists.
  - a. Please explain in detail what is meant by the statement "A community kitchen is also proposed for public use [and benefit]".

Please be aware that Plan Approval (PA) will likely require landscaping to screen surrounding properties from noise and views. Please provide an updated site plan with landscaping or a more thorough description of landscaping that will be used.

If you have any questions, please contact Alex Roy at (808) 961-8140, or via email at <u>Alex.Roy@hawaiicounty.gov</u>.

Sincerely,

Norren Kato

NORREN KATO Administrative Permits Division Manager

AJR:jaa \\COH01\planning\public\wpwin60\CH343\2022\HKB\_DEA\HKB\_LLC\_DEA\_Comments\_2022-mjj edits.docx



March 14, 2023

Jeffery Darrow, Deputy Director Hawai'i County Planning Department 101 Pauahi Street Hilo, Hawai'i 96720

# Subject:Re-Submission of Draft Environmental Assessment (DEA) for the Hawaiian<br/>Kingdom Brands Kanaka Beverage Plant and CaféApplicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, Hawai'iTMK:(3) 2-2-033: 011

Dear Mr. Darrow,

Thank you for your comments dated December 9, 2022, regarding the review of the Draft Environmental Assessment for Hawaiian Kingdom Brands. We acknowledge and accept your comments, which have been incorporated into a new version of the DEA. Per your comments, the following changes have been made:

- The upcoming Island Naturals commercial building project, approved under SMA Use Permit No. 21-000079, was included in the "Upcoming Planned Project" section of the TIAR to discuss potential traffic impacts. Please see pages 22-23 in Appendix D for an updated version of the TIAR. A discussion on this project has also been included in Section 3.3.1 on pages 98-99 and in Section 3.4, on page 122 of the DEA.
- 2. Questions regarding the proposed well:
  - a. What if the water from the confined aquifer is not up to Department of Health (DOH) standards?
  - b. If water is not up to DOH standards, will treatment of water be utilized before resale?

The water from the subject aquifer is expected to be of very high quality and will be treated with nanofiltration and UV sterilization. If the water complies with the Department of Health's (DOH) standards for drinking water, then the well will be completed for production. However, if the water quality falls below expectations and extensive nanofiltration and UV sterilization is necessary, the project may not move forward due to financial feasibility concerns.

c. What if during testing the well does impact basal water sources? Is there an alternative plan?

If the well is found to impact basal water sources during testing, then Hawaiian Kingdom Brands will refer to CWRM for course of action. Several mitigating



measures may be put into place by CWRM depending on the type and severity of impacts seen.

- 3. Clarification was sought from the Commission on Water Resource Management regarding the regulation of the subject aquifer vs. the Hilo/Onomea Aquifer System Areas. At this time, CWRM recognizes the importance of Dr. Thomas' research and the valuable perspective it offers on the hydrogeology of the Hilo area; however, they have not implemented a regulatory framework that takes into account the possibility of multiple deep aquifers that could come from separate watersheds. Their current regulatory framework would look at drilling logs and lithology to determine how the subject aquifer would be regulated. **CWRM made clear that they would prefer to speak with the Planning Department directly regarding this additional consultation.** Please contact Ryan R. Imata, Hydrologic Program Manager with the Ground Water Regulation Branch at (808) 636-8502 or <u>ryan.r.imata@hawaii.gov</u>. Clarification that the resources available from the confined aquifer differ from the recognized Hilo/Onomea Aquifer System Areas has been incorporated throughout the EA. Please refer to **page 59** for an example.
- 4. A Storm Water Pollution Prevention Plan (SWPPP) was prepared for this DEA by Engineering Partners, Inc. The SWPPP describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. The report is summarized in **Section 3.1.4 of the DEA on pages 74-78**. A full copy of the report can be found in **Appendix B**.
- 5. Please see **Appendix E** for our response to Sierra Club addressing each of their concerns directly and references to appropriate sections of the EA.
- 6. A more thorough discussion on plastic waste in the SMA has been added to Section 3.4 on page 120 and 121.
- 7. A Jurisdictional Determination was sought from the U.S. Army Corps of Engineers, Honolulu District, however, their preliminary review of the site deemed a JD unnecessary at this time as there is no reason to believe aquatic resources exist on site.
- 8. The café kitchen will be available for community use outside of café open hours. Interested community members will be able to sign up to schedule time in the kitchen for a small fee. No fee will apply to non-profit organizations and native Hawaiians. The community kitchen will not support food trucks and will not host community events or classes. Please see **page 91** for this discussion.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

An

John Pipan Planning Administrator



SUZANNE D. CASE

MICHAEL G. BUCK ELIZABETH A. CHAR, M.D. NEIL J. HANNAHS AURORA KAGAWA-VIVIANI, PH.D. WAYNE K. KATAYAMA PAUL J. MEYER

M. KALEO MANUEL

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT P.O. BOX 621

HONOLULU, HAWAII 96809

June 20, 2022

REF: RFD.5901.8

ГО:	John Pipan, Planning Administrator
	Land Planning Hawaii LLC

Hukker O M. Kaleo Manuel, Deputy Director FROM: Commission on Water Resource Management

SUBJECT: Early Request for Comment for a Draft Environmental Assessment Proposed Warehouse/Manufacturing Plant and Cafe/Restaurant, Waiakea Houselots, South Hilo, Hawaii

FILE NO.:	RFD.5901.8
TMK NO.:	(3) 2-2-033:011

X

Thank you for the opportunity to review the subject document. The Commission on Water Resource Management (CWRM) is the agency responsible for administering the State Water Code (Code). Under the Code, all waters of the State are held in trust for the benefit of the citizens of the State, therefore all water use is subject to legally protected water rights. CWRM strongly promotes the efficient use of Hawaii's water resources through conservation measures and appropriate resource management. For more information, please refer to the State Water Code, Chapter 174C, Hawaii Revised Statutes, and Hawaii Administrative Rules, Chapters 13-167 to 13-171. These documents are available via the Internet at <a href="http://dlnr.hawaii.gov/cwrm">http://dlnr.hawaii.gov/cwrm</a>.

Our comments related to water resources are checked off below.

- We recommend coordination with the county to incorporate this project into the county's Water Use and Development Plan. Please contact the respective Planning Department and/or Department of Water Supply for further information.
  - 2. We recommend coordination with the Engineering Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.
  - 3. We recommend coordination with the Hawaii Department of Agriculture (HDOA) to incorporate the reclassification of agricultural zoned land and the redistribution of agricultural resources into the State's Agricultural Water Use and Development Plan (AWUDP). Please contact the HDOA for more information.
- 4. We recommend that water efficient fixtures be installed and water efficient practices implemented throughout the development to reduce the increased demand on the area's freshwater resources. Reducing the water usage of a home or building may earn credit towards Leadership in Energy and Environmental Design (LEED) certification. More information on LEED certification is available at http://www.usgbc.org/leed. A listing of fixtures certified by the EAP as having high water efficiency can be found at http://www.epa.gov/watersense.
- 5. We recommend the use of best management practices (BMP) for stormwater management to minimize the impact of the project to the existing area's hydrology while maintaining on-site infiltration and preventing polluted runoff from storm events. Stormwater management BMPs may earn credit toward LEED certification. More information on stormwater BMPs can be found at http://planning.hawaii.gov/czm/initiatives/low-impact-development/
  - 6. We recommend the use of alternative water sources, wherever practicable.
  - 7. We recommend participating in the Hawaii Green Business Program, that assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. The program description can be found online at http://energy.hawaii.gov/green-business-program.
  - 8. We recommend adopting landscape irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawaii. These practices can be found online at

#### John Pipan Page 2 June 20, 2022

		http://	www.hawaiiscape.com/wp-content/uploads/2013/04/LICH_Irrigation_Conservation_BMPs.pdf.			
Х	9.	There appro develo	may be the potential for ground or surface water degradation/contamination and recommend that vals for this project be conditioned upon a review by the State Department of Health and the oper's acceptance of any resulting requirements related to water quality.			
3-	10	The p a Wat requir	roposed water supply source for the project is located in a designated water management area, and er Use Permit is required prior to use of water. The Water Use Permit may be conditioned on the ement to use dual line water supply systems for new industrial and commercial developments.			
	11	The H other Decer consid includ Please guidel	lawaii Water Plan is directed toward the achievement of the utilization of reclaimed water for uses than drinking and for potable water needs in one hundred per cent of State and County facilities by nber 31, 2045 (§174C-31(g)(6), Hawaii Revised Statutes). We strongly recommend that this project der using reclaimed water for its non-potable water needs, such as irrigation. Reclaimed water may e, but is not limited to, recycled wastewater, gray water, and captured rainwater/stormwater. e contact the Hawai'i Department of Health, Wastewater Branch, for more information on their reuse lines and the availability of reclaimed water in the project area.			
Х	12	A Wel work.	I Construction Permit(s) is (are) are required before the commencement of any well construction			
Х	13	A Pun the pr	np Installation Permit(s) is (are) required before ground water is developed as a source of supply for oject.			
20	14	There affecte abanc	is (are) well(s) located on or adjacent to this project. If wells are not planned to be used and will be ed by any new construction, they must be properly abandoned and sealed. A permit for well lonment must be obtained.			
20	15	Groun standa	und-water withdrawals from this project may affect streamflows, which may require an instream flow ndard amendment.			
3-	16	A Stread	eam Channel Alteration Permit(s) is (are) required before any alteration can be made to the bed r banks of a steam channel.			
3-	17	A Stre	eam Diversion Works Permit(s) is (are) required before any stream diversion works is constructed or d.			
3	18	A Peti of sur	tion to Amend the Interim Instream Flow Standard is required for any new or expanded diversion(s) face water.			
() 	19	The p deterr water	lanned source of water for this project has not been identified in this report. Therefore, we cannot nine what permits or petitions are required from our office, or whether there are potential impacts to resources.			
Х	ОТН	ER:	Planning Branch -			
			CWRM would like to expand the water audit program to include ways to address water losses and data validity challenges from the affected PWS. Act 169 affects different public water systems (PWS) which are not utilities and do not have customers in the traditional sense that a typical water utility does. We recommend participating in the Water Audit Program and updating your water usage data to further increase water efficiency in the water system.			
			Ground Water Branch -			

The DEA should include a discussion of the Hilo/Onomea Aquifer System Area, its sustainable yield, and how proposed water demands will affect available sustainable yield.

Impacts to ground water dependent ecosystems are becoming an emerging issue as impacts to these are related to impacts to traditional & customary practices of sustenance from these ecosystems. We recommend consultation with the region's (moku) Aha Moku Council on whether a land use conversion or project that uses water will impact any traditional & customary practices.

If you have any questions, please contact Ryan Imata of the Regulation Branch at 587-0225 or Katie Roth of the Planning Branch at 587-0216.



March 14, 2023

Kaleo Manuel Commission on Water Resource Management (CWRM) P.O Box 621 Honolulu, Hawai'i 96809

# Subject:Response to Early Consultation Comments for the Hawaiian Kingdom<br/>Brands Draft Environmental Assessment (DEA)Applicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, Hawai'iTMK:(3) 2-2-033: 011

#### Aloha,

Thank you for your comments dated June 20, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. We acknowledge and accept your comments, which have been incorporated into the DEA. Please see below for our response to each concern and corresponding sections of the DEA to reference for more information.

- 1. The applicant will coordinate with the County to incorporate the project into the County's Water Use and Development Plan.
- Water efficient fixtures and practices will be implemented throughout the development to reduce the increased demand on the area's freshwater resources. Please review Section 3.3.2 and pages 116-118 for water saving details.
- 3. A Storm Water Pollution Prevention Plan (SWPPP) was prepared for this DEA by Engineering Partners, Inc. The SWPPP describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. The report is summarized in Section 3.1.4 of the DEA on pages 74-78. A full copy of the report can be found in Appendix B.
- 4. The applicant will participate in the Hawai'i Green Business Program, which assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner.
- 5. Landscaping irrigation conservation best management practices endorsed by the Landscape Industry Council of Hawai'i will be incorporated on site. Please review **Section 3.3.2 and pages 116-118.**
- 6. The applicant recognizes that there may be the potential for ground or surface water degradation/contamination and will ensure that approvals for the project are conditioned



upon a review by the State Department of Health. The applicant assumes responsibility for any resulting requirements related to water quality based on DOH's review.

- 7. The applicant acknowledges that a Well Construction Permit must be approved before the commencement of any well construction work and that a Pump Installation Permit is also required before ground water is developed as a source of supply for the project.
- 8. The project will participate in the Water Audit Program and will update water usage data to further increase water efficiency in the water system.
- A discussion on the Hilo and Onomea Aquifer System Areas sustainable yields and how proposed water demands will affect sustainable yield is included in Section 3.1.2, pages 58-64.
- The applicant acknowledges the importance of ground water dependent ecosystems to traditional and customary practices. A discussion on this matter is included in Section 3.2.2, pages 91-94. Please also review Section 3.1.2 for detail on ground water dependent ecosystems.
- 11. Per email correspondence on Wednesday February 1, 2023, with Ryan Imata of the regulation branch: the Hawai'i County Planning Department has been informed on CWRM's desire to speak directly with the Planning Department regarding CWRM's current regulatory framework for the deep aquifer. Ryan Imata's contact information has been forwarded to the Planning Department for direct consultation.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

John Pipan Planning Administrator Land Planning Hawai'i LLC



### STATE OF HAWAI'I OFFICE OF PLANNING & SUSTAINABLE DEVELOPMENT

235 South Beretania Street, 6th Floor, Honolulu, Hawai'i 96813 Mailing Address: P.O. Box 2359, Honolulu, Hawai'i 96804 DAVID Y. IGE GOVERNOR

MARY ALICE EVANS DIRECTOR

 Telephone:
 (808) 587-2846

 Fax:
 (808) 587-2824

 Web:
 https://planning.hawaii.gov/

#### DTS 202209080902NA

September 28, 2022

Program Environmental

Coastal Zone Management

Review Program

Land Use Commission

Land Use Division

Special Plans Branch

State Transit-Oriented Development

Statewide Geographic Information System

Statewide Sustainability Branch Mr. John Pipan Planning Administrator Land Planning Hawaii LLC 194 Wiwo'ole Street Hilo, HI 96720

Dear Mr. Pipan:

Subject: Pre-Consultation for Draft Environmental Assessment for the Proposed Deep Water Well, Manufacturing Plant, and Café at Waiākea Houselots, South Hilo, Hawaii; Tax Map Key: (3) 2-2-033: 011

The Office of Planning and Sustainable Development (OPSD) is in receipt of your Environmental Assessment (EA) pre-consultation request, dated September 8, 2022, for the proposed deep-water well and bottling water plant project at Waiākea Houselots, South Hilo.

According to the pre-consultation request, Hawaiian Kingdom Brands proposes to construct a manufacturing plant to bottle water and roast coffee products as well as a café for customers on the subject property, which consists of approximately 2.57 acres of land zoned Limited Industrial ML-20. The project includes construction of a 30,000 square foot bottling and roasting plant and an 1,800 square foot café with a drive-through. The bottling and roasting plant would be served by a new 1,000-foot deep-water well, which would withdraw a maximum of 200,000 gallons per day of water from an aquifer located between 1,000 and 1,400 feet below the Hilo Aquifer 80401/Onomea Aquifer 80204. The subject property is located within the county designated special management area (SMA).

The OPSD has reviewed the subject pre-consultation request and has the following comments to offer:

1. The EA shall discuss all triggers of preparation of an EA set forth in Hawaii Revised Statutes (HRS) Chapter 343 and/or county SMA rules.

Mr. John Pipan September 28, 2022 Page 2

- 2. The EA should provide a regional location map of the subject property on the Island of Hawaii, with the project site in relation to the county designated SMA.
- 3. Hawaii Coastal Zone Management (CZM) Law, HRS Chapter 205A, requires all state and county agencies to enforce the CZM objectives and policies. The subject EA should include an assessment with mitigation measures, if needed, as to how the proposed development conforms to each of the CZM objectives and supporting policies set forth in HRS § 205A-2, as amended.
- 4. The EA shall list all required permits and approvals from the federal, state, and county for the proposed deep-water well and bottling water plant project. The applicant shall discuss the potential requirements of SMA use for construction and operations of the proposed project by consulting with the County of Hawaii Department of Planning.
- 5. The Hawaii Intermediate Court of Appeals' (ICA) decision in *Kauai Springs, Inc.*, v. *Planning Commission of the County of Kauai*, dated April 30, 2013, requires decision-makers to specifically consider the applicant's use of public trust resources pursuant to Article XI, Section 1 of the Hawaii Constitution. Where public trust resources are used for economic gain, the ICA requires the county authorities to give the permit application a higher level of scrutiny and place a higher burden on the applicant to justify the use of the public trust resources. Given that the proposed water well and bottling facility project seeks the use of groundwater for economic gain, public trust resource evaluation required by the ICA should be applied to the subject SMA use assessment.
- 6. According to the pre-consultation request, the project site is roughly 625 feet east of the Waiākea Fishpond, and the groundwater source in the subject area is not currently designated under the Commission on Water Resource Management (CWRM) and thus does not have an established Sustainable Yield. Given the impacts of climate change, the EA shall provide updated aquifer information and data, including geological survey and aquifer hydrologic maps, associated with the subject area, and consider any potential long-term effects of lowering the aquifer level beyond the lifespan of the proposed well project. Input and comments should be specifically sought from the CWRM for the proposed use of groundwater source in the area.
- 7. Please note that OPSD provided comments, dated June 27, 2018, on the SMA Use Permit Application (SMA 18-000070) for a potable water well and botting facility, Waiākea, South Hilo, TMK (3) 2-2-033: 011. According to the SMA Use Permit application, the groundwater resource in the subject area is part of the "Northeast Mauna Loa aquifer system of the Hilo aquifer system." This aquifer, is currently

Mr. John Pipan September 28, 2022 Page 3

used as a drinking water source, is fresh, irreplaceable, and is highly vulnerable to contamination.

If you have any questions regarding this comment letter, please contact Shichao Li of our office at (808) 587-2841, or by email at shichao.li@hawaii.gov.

Sincerely,

· Mary Alice Evans

Mary Alice Evans Director



March 14, 2023

Hawai'i State Office of Planning and Sustainable Development (OPSD) 235 South Beretania Street Honolulu, Hawai'i 96813

# Subject:Response to Early Consultation Comments for the Hawaiian Kingdom<br/>Brands Draft Environmental Assessment (DEA)Applicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, Hawai'iTMK:(3) 2-2-033: 011

#### Aloha,

Thank you for your comments dated September 28, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. We acknowledge and accept your comments, which have been incorporated into the DEA. Please see below for our response to each concern and corresponding sections of the DEA to reference for more information.

- 1. Please review Section 1.4, page 31 for discussion on the Environmental Assessment triggers set forth in Hawai'i Revised Statues (HRS) Chapter 343 and County SMA rules.
- 2. Section 3.6.2, pages 129-135 include discussion on how the project conforms to each of the Coastal Zone Management laws, objectives and supporting policies set forth in HRS Chapter 205A-2, as amended.
- 3. A complete list of all required permits and approvals from the federal, state, and county is included in Section 3.5 on page 122.
- 4. Water rights including the Public Trust Doctrine are discussed in Section 3.6.4, pages 137-144.
- 5. Please review **Section 3.1.2**, **pages 39-66** for analysis of the hydrologic resources related to the project.
- 6. The statement that the subject aquifer is "currently used as a drinking water source, is fresh, irreplaceable, and is highly vulnerable to contamination" is not accurate. The original quote can be found in Mink and Lau (1990) referring to the Hilo Aquifer System Area (80401), an unconfined basal aquifer, which is indeed subject to possible contamination from surface activities. However, this is not the case for the deep confined subject aquifer. Please refer to **page 54** for details on this matter.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

M

John Pipan Planning Administrator Water bottling at Wailoa... Again? by Cory Harden from Sierra Club

Two years ago, the Pi'ilani Partners proposal for a water bottling plant near Wailoa Park was soundly rejected by the Windward Planning Commission. But now a similar proposal has popped up for the same site.

The site has been purchased by an out-of-state company.

The new proposal is by Hawaiian Kingdom Brands, which plans to drill down almost a quarter of a mile into a previously untouched aquifer, withdraw up to 200,000 gallons of water a day, and bottle it. They would build a 30,000-square-foot water bottling plant, coffee roasting facility, and drive-through café.

It's unclear what relationship "Hawaiian Kingdom Brands" has to the actual Hawaiian kingdom.

The aquifer they propose to tap into has been identified as "fresh, irreplaceable and highly vulnerable to contamination" by the state Office of Planning. They would extract a natural public trust resource—water---solely for commercial gain.

There is a risk of contamination, from arsenic in the muck at the bottom of nearby Wailoa River, if a tsunami hits before valves in drilling pipes can be closed. For Pi'ilani Partners, the Commission said that the tax revenue and the few jobs that would be generated did not justify the risk of contaminating public trust water.

Some of the aquifer water now flows underground and discharges into the ocean. If withdrawal diminishes that flow, it is unclear how the ocean ecosystem will be affected.

It takes three bottles of water to produce one finished bottle of water. Most of the wastewater from production is contaminated and cannot be reused.

The new company proposes using glass bottles for local sales and—maybe--recycled plastic bottles for non-local sales. But most bottles are unlikely to be recycled again, because, nationwide, about 80% of water bottles are not recycled.

Extracting, processing, bottling, transporting, and refrigerating water burns oil—nationwide, 50 million barrels a year. If bottles contain PET (polyethylene terephthalate, or polyester), that doesn't biodegrade, but breaks into tiny fragments. The fragments absorb pollutants which can contaminate water and the food chain.

Bottled water has been banned by six cities, almost two dozen national parks, and over a dozen colleges and universities.

Concern over the impacts from Pi'ilani Partners led to strong opposition in over 200 pieces of written testimony, and from over 25 people testifying in person. The only people who spoke up in support were people paid to do so. The new project would bring additional impacts—not just

noisy trucks as with Pi'ilani, but also traffic from numerous cars transporting people to the café and drive-through.

However, Hawaiian Kingdom Brands does deserve credit for planning an Environmental Assessment and contacting Sierra Club early for comments. Stay tuned for opportunities to weigh in.



March 14, 2023

Sierra Club Hawaiʻi P.O. Box 2577 Honolulu, Hawaiʻi 96803

# Subject:Response to Early Consultation Comments for the Hawaiian Kingdom<br/>Brands Draft Environmental Assessment (DEA)Applicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, HawaiʻiTMK:(3) 2-2-033: 011

Aloha,

Thank you for your comments dated August 1<sup>st</sup>, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. We acknowledge and accept your comments, which have been incorporated into the DEA. Please see below for our response to each concern and corresponding sections of the DEA to reference for more information.

#### 1. STATE OFFICE OF PLANNING

Letters produced in 2018 and 2022 by the Office of Planning and Sustainable Development (OSPD) state that the subject aquifer is "currently used as a drinking water source, is fresh, irreplaceable, and is highly vulnerable to contamination." However, this quote is incorrectly referring to the subject aquifer. The original quote can be found in Mink and Lau (1990) referring to the Hilo Aquifer System Area (80401), an unconfined basal aquifer, which is indeed subject to possible contamination from surface activities. Please refer to **page 54** for details on this matter.

#### 2. CONTAMINATION

a. Arsenic

The Environmental Site Assessment conducted in 2018 found no evidence of past or current Recognized Environmental Conditions (REC), including arsenic pollution. Any potential contamination from past tsunami events or former land use that impacted the property is no longer detectable. Please refer to **Section 3.1.7, pages 87-88** for the full discussion.

b. Saltwater Upconing

CWRM will review pump tests before a Well Permit is approved to ensure there will be no impacts to ground water resources, prevent saltwater upconing and excessive drawdown, to ensure a recharge boundary won't affect other resources and to keep



the use significantly below the sustainable yield. Refer to Section 3.1.2, pages 52-54 for a more detailed information regarding contamination.

c. Wastewater

Wastewater from the proposed action does not pose a risk to any ground water resource. The subject site will be connected to the County sewer line and the project will incorporate wastewater management practices. Efforts to minimize wastewater are reflected in the design of the proposed project, including the use of water from the deep confined aquifer, which will be treated using nanofiltration and UV light disinfection. Water from the proposed deep well will require less treatment and will therefore produce less wastewater compared to water from the county aquifer. Compressed air will be used to "rinse" bottles before they are filled to minimize water use and wastewater as well. Best Management Practices will be strictly followed during construction activities to manage storm water runoff. These are detailed in **Section 3.1.4**. Please also refer to **Section 3.1.2 pages 52-54**.

d. Storm Water Runoff

A Storm Water Pollution Prevention Plan (SWPPP) was prepared for this DEA by Engineering Partners, Inc. The SWPPP describes the procedures that will be used to prevent non-point source pollution from spreading beyond the project site during construction. The report is summarized in Section 3.1.4 of the DEA on pages 74-78. A full copy of the report can be found in Appendix B.

e. Hazardous Chemicals

The required permit approvals including the Well Construction Permit will ensure no hazardous chemicals are used during the exploratory or development phases of the proposed well. **Sections 3.1.2 and 3.1.7** detail potential contamination and hazardous material impacts.

#### 3. GROUND WATER DEPENDENT ECOSYSTEMS (GDE)

CWRM requires pump tests for all new wells with a proposed pumping rate greater than 50 gallons per minute as part of the Well Permit application process. Data from these tests are used to determine the potential for the proposed well to impact nearby streams and marshes and ensures a recharge boundary won't affect other resources. If it is determined that the new well is likely to adversely impact a surface water body, CWRM would take several actions to mitigate impacts. **Section 3.1.2 on pages 64-66** has further discussion.



#### 4. PLASTIC POLLUTION

Hawaiian Kingdom Brands is not proposing to sell plastic bottles within the state at any time. When necessary, HKB intends to only use high quality recycled and carbon neutral plastic bottles during glass supply shortages to avoid furloughing employees if glass supply shortages occur. The number of potential plastic bottles to be used in the event of a supply shortage is currently unknown. Therefore, it has been recommended that estimates are determined and refined throughout the permitting process to ensure a significant impact from plastic waste does not occur. Hawaiian Kingdom Brands does intend to host company beach clean ups and promote educational programs that encourages recycling and responsible use of disposing plastic products. Please refer to **Section 3.4 Page 120 and 121** for more.

#### 5. GREENHOUSE GAS EMISSIONS

Section 3.1.2 pages 54-58 includes a full discussion on climate change and potential greenhouse gas emissions from the proposed project including vehicular and truck trips, shipments, exhaust from coffee roasting activities, as well as power.

#### 6. NOISE

Section 3.1.6 pages 84-87 discuss potential noise impacts from construction and operation activities including the café, the beverage bottling plant, coffee roasting, and well operations.

#### 7. WATER RIGHTS

Section 3.6.4, pages 137-145 include discussion on various water rights laws including the Hawai'i Constitutional Public Trust Doctrine, the State Water Code, the Hawai'i Water Plan and the Water Resource Protection Plan 2019 Update, as well as the Correlative Rights Doctrine.

#### 8. COMMUNITY BENEFITS

The project would have a very substantial positive impact on economic welfare and social welfare by providing up to 100 jobs for residents when fully operational. The project would also establish an all Native-Hawaiian board to oversee company decisions and act as a visible reminder that the Hawaiian Kingdom exists. The café kitchen will be available for community use outside of café open hours. Interested community members will be able to sign up to schedule time in the kitchen for a small fee. No fee will apply to non-profit organizations and native Hawaiians. The community kitchen will not support food trucks and will not host community events or classes. Community benefits are discussed in various sections throughout the EA.



#### 9. ALTERNATIVES

There are no other action alternatives that could meet the purpose and need of the project. The proposed action requires Industrial zoning and thus has limited site alternatives. The Department of Water Supply does not allow the use of County water for bottling and resale; therefore, the use of County water for bottled beverages is not an alternative option. Water from the shallow unconfined basal aquifer is also not an option due to the location of the property in relation to the Underground Injection Control (UIC) line. Please refer to **Section 2.1 on page 33** for more information.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

John Pipan Planning Administrator Land Planning Hawai'i LLC

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

#### **STATE OF HAWAII** DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

Apr 14, 2022

#### MEMORANDUM

TO:

**DLNR Agencies:** 

X Div. of Aquatic Resources (kendall.l.tucker@hawaji.gov) X Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov) X Engineering Division (DLNR.ENGR@hawaii.gov) X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov) X Div. of State Parks (curt.a.cottrell@hawaii.gov) X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov) Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov) X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

Russell Y. Tsuji, Land Administrator Russell Tsuji FROM: SUBJECT: Early Request for Comment for a Draft Environmental Assessment for the Proposed Warehouse/Manufacturing Plant and Café/Restaurant LOCATION: Waiakea Houselots, South Hilo, Island of Hawaii; TMK: (3) 2-2-033:011 **APPLICANT:** Land Planning Hawaii LLC on behalf of Hawaiian Kingdom Brands

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by May 9, 2022.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at darlene.k.nakamura@hawaii.gov. Thank you.

**BRIEF COMMENTS:** 

- We have no objections. ( )
- ) We have no comments.
- We have no additional comments. ( )
- $(\mathbf{\nabla})$ Comments are included/attached.

MIL

Signed:	
Print Name:	Brian J. Neilso
Division:	Aquatic Resou
Date:	May 9, 2022

n- Administrator rces

Attachments CC: **Central Files** 

DAVID Y. IGE GOVERNOR OF HAWAH	STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES DIVISION OF AQUATIC RESOURCES 1151 PUNCHBOWL STREET, ROOM 330 HONOLULU, HAWAII 96813 Date: 05/09/2022 DAR # <u>AR0174</u>	BUZANNE D. CASE CHARPERSON DOADRO OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT <b>COBERT K. MASUDA</b> HERT DEPUTY MENT DEPUTY DEPUTY DIRECTOR - WATER DEPUTY DIRECTOR - WATER DATING AND OCEAN RECEIDATION BUREAU OF CONVEYANCES DOATING AND OCEAN RECEIDATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND RESOURCES ENFORCEMENT CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS
<u>MEMORANI</u> TO:	<u>DUM</u> Brian J. Neilson DAR Administrator	
FROM:	Troy Sakihara 755, Aquatic Biologist	
SUBJECT:	Review of Draft Environmental Assessment, Proposed Warehouse/Manufacturing Plant and Cafe/Restaurant Brands	d , Hawaiian Kingdom
Request Subn Location of P	nitted by: <u>Russell Tsuji, Land Administrator, DLNR</u> Waiakea House Lots, South Hilo, Hawaii Island, TMK: (3) 2-2-03 roject:	33:011
Brief Descrip Hawaiian Ki producing b 2.571 acres feet east of mouth. Prop foot cafe/res new water w	tion of Project: ngdom Brands is proposing to construct a warehouse/m ottled water and local coffee products, and a cafe/restau , zoned Limited Industrial ML-20 in the Special Manager Waiakea Fishpond and Wailoa River and 2300 feet sout osed construction includes a 30,000 square foot wareho staurant, outdoor seating area, parking, and a loading do yell to serve the bottling and roasting plant.	nanufacturing plant for urant. The property is ment Area, located 625 th of Wailoa River ouse, 15,000 square ock. Also proposed is a
Comments		

□ No Comments ☑ Comments Attached

Thank you for providing DAR the opportunity to review and comment on the proposed project. Should there be any changes to the project plan, DAR requests the opportunity to review and comment on those changes.

May 9, 2022 \_\_\_\_\_ Date: \_\_\_\_\_

Comments Approved:

Brian J. Neilson DAR Administrator DAR# AR0174

#### Comments

The DAR's comments and concerns and with this project are primarily regarding the proposed new well that is to be drilled on site. The absence of any proposed pumping rate or information on groundwater discharge or recharge rates of the area precludes any accurate predictions or preliminary assessment of potential impacts to nearby aquatic ecosystems, particularly Waiakea Fishpond and Wailoa River estuary. However, it is important to note that these aquatic habitats are primarily driven by groundwater discharge and highly dependent on such to naturally function as estuarine habitat for native species, especially juvenile and adult fishes important to the local noncommercial fishery. Any actions that may cause measurable impacts to natural groundwater discharge rates in Waiakea Pond and Wailoa River should be assessed and avoided. Further, intermittent anchialine pools that form during high tides have been reported in nearby properties. These pools may support populations of an endemic shrimp, Halocaridina rubra, commonly known as 'opae 'ula. Therefore, if naturally present on the subject property, we recommend these anchialine habitats be left undisturbed or avoided as much as possible. Lastly, we remind the client that best management practices be upheld during all phases of the project.



March 14, 2023

Department of Land and Natural Resources Division of Aquatic Resources P.O. Box 621 Honolulu, HI 96809

# Subject:Response to Early Consultation Comments for the Hawaiian Kingdom<br/>Brands Draft Environmental Assessment (DEA)Applicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, Hawai'iTMK:(3) 2-2-033: 011

Aloha,

Thank you for your comments dated April 14, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. We acknowledge and accept your comments, which have been incorporated into the DEA.

The applicant acknowledges that the absence of any proposed pumping rate precludes accurate predictions and preliminary assessment of potential impacts to nearby aquatic ecosystems. Please review **Section 3.1.2 on pages 39-66** for a thorough discussion on this matter. Please note that CWRM requires the review of pump tests to determine the potential for the proposed well to impact all ground and surface water bodies before a Well Permit is approved.

Nevertheless, any action that may cause measurable impacts to natural ground water discharge rates to Wailoa River/Waiākea Fishpond and highly dependent estuarine habitats will be assessed and avoided.

The applicant acknowledges that intermittent anchialine pools that may support the endemic shrimp known as 'ōpae'ula have been reported on nearby properties. No evidence of such pools exists on the subject property; however, best management practices will be upheld during all phases of the project to ensure the highest conservation potential of all natural resources.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

John Pipan Planning Administrator Land Planning Hawai'i LLC

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

Apr 14, 2022

#### **MEMORANDUM**

FROM: <del>TO:</del>

**DLNR Agencies:** 

X Div. of Aquatic Resources (kendall.l.tucker@hawaii.gov) X Div. of Boating & Ocean Recreation (richard.t.howard@hawaii.gov) X Engineering Division (DLNR.ENGR@hawaii.gov) X Div. of Forestry & Wildlife (rubyrosa.t.terrago@hawaii.gov) X Div. of State Parks (curt.a.cottrell@hawaii.gov) X Commission on Water Resource Management (DLNR.CWRM@hawaii.gov) Office of Conservation & Coastal Lands (sharleen.k.kuba@hawaii.gov) X Land Division – Hawaii District (gordon.c.heit@hawaii.gov)

TO:FROM:<br/>SUBJECT:Russell Y. Tsuji, Land Administrator Russell TsujiSUBJECT:Early Request for Comment for a Draft Environmental Assessment for the<br/>Proposed Warehouse/Manufacturing Plant and Café/Restaurant<br/>Waiakea Houselots, South Hilo, Island of Hawaii; TMK: (3) 2-2-033:011<br/>Land Planning Hawaii LLC on behalf of Hawaiian Kingdom Brands

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 9, 2022**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at <u>darlene.k.nakamura@hawaii.gov</u>. Thank you.

**BRIEF COMMENTS:** 

- ) We have no objections.
- ) We have no comments.
- () We have no additional comments.
- $(\checkmark)$  Comments are included/attached.

Signed:

Print Name:Carty S. Chang, Chief EngineerDivision:Engineering DivisionDate:Apr 26, 2022

Attachments cc: Central Files

#### DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION

LD/Russell Y. Tsuji

Ref: Early Request for Comments for a Draft Environmental Assessment for the Proposed Warehouse/Manufacturing Plant and Café/Restaurant Location: Waiakea Houselots, South Hilo, Island of Hawaii TMK(s): (3) 2-2-033:011
 Applicant: Land Planning Hawaii LLC on behalf of Hawaiian Kingdom Brands

#### **COMMENTS**

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a Special Flood Hazard Area (high-risk areas). Be advised that 44CFR, Chapter 1, Subchapter B, Part 60 reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may stipulate higher standards that can be more restrictive and would take precedence over the minimum NFIP standards.

The owner of the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood zones subject to NFIP requirements are identified on FEMA's Flood Insurance Rate Maps (FIRM). The official FIRMs can be accessed through FEMA's Map Service Center (msc.fema.gov). Our Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT) could also be used to research flood hazard information.

If there are questions regarding the local flood ordinances, please contact the applicable County NFIP coordinating agency below:

- Oahu: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- o <u>Hawaii Island</u>: County of Hawaii, Department of Public Works (808) 961-8327.
- o <u>Maui/Molokai/Lanai</u> County of Maui, Department of Planning (808) 270-7139.
- o Kauai: County of Kauai, Department of Public Works (808) 241-4849.

Signed:

CARTY S. CHANG, CHIEF ENGINEER

Date: Apr 26, 2022



March 14, 2023

Russell Tsuji Department of Land and Natural Resources Engineering Division P.O. Box 621 Honolulu, HI 96809

Subject:	Response to Early Consultation Comments for the Hawaiian Kingdom
	Brands Draft Environmental Assessment (DEA)
Applicant:	Hawaiian Kingdom Brands
Location:	Waiākea Houselots, South Hilo, Hawai'i
TMK:	(3) 2-2-033: 011

Aloha,

Thank you for your comments dated April 14, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. The applicant acknowledges DLNR Engineering Division's regulations regarding the National Flood Insurance Program (NFIP).

The applicant will comply with the rules and regulations of the National Flood Insurance Program, Title 44 of the Code of Federal Regulations (44FCR). The subject property lies within Flood Zone X, or outside of the 500-year floodplain, and therefore has a low flood risk. Please review **Section 3.1.3 and pages 66-69** in the DEA for further details.

Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

John Pipan Planning Administrator Land Planning Hawai'i LLC



#### DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I

345 KEKŪANAŌʻA STREET, SUITE 20 • HILO, HAWAIʻI 96720 TELEPHONE (808) 961-8050 • FAX (808) 961-8657

April 21, 2022

Mr. John Pipan Land Planning Hawai'i LLC 194 Wiwoole Street Hilo, HI 96720

Dear Mr. Pipan:

#### Subject: Early Request for Comment for a Draft Environmental Assessment for Proposed Warehouse/Manufacturing Plant and Café/Restaurant Tax Map Key 2-2-033:011

We have reviewed the subject request and have the following comments and conditions.

Water is available from an existing 6-inch waterline within Pi'ilani Street fronting the subject parcel. The subject parcel is served by an existing 5/8-inch meter (Account No. 100-65700), which is limited to a maximum daily usage of 600 gallons.

The Department requests that the applicant submit estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, for review and approval. The water usage calculations should include the estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including all irrigation use.

Upon receipt of the water usage calculations above, the Department will make a determination as to the water commitment deposit amount and prevailing facilities charge, which is subject to change, to be paid. Based on the water demand calculations, the Department will determine the appropriate service lateral and meter size required.

The proposed zoning will require the installation of a reduced pressure type backflow prevention assembly, by a licensed contractor, within five (5) feet of the meter on private property. If a larger or additional meter is required, a backflow prevention assembly will also be required for that meter. The installation of the backflow prevention assembly(s) must be inspected and approved by the Department before commencement of water service.

Subject to other agencies' requirements to construct improvements within the road right-of-way fronting the property affected by the proposed development, the applicant shall be responsible for the relocation and adjustment of the Department's affected water system facilities, should they be necessary.

... Water, Our Most Precious Resource ... Ka Wai A Kāne ... The Department of Water Supply is an Equal Opportunity provider and employer. Mr. John Pipan Page 2 April 21, 2022

For your information, the existing 6-inch waterline within Pi'ilani Street and the existing 8-inch waterline within Manono Street are both inadequate to provide the required 2,000-gallons per minute of flow for fire protection, as per the Department's Water System Standards.

Should there be any questions, please contact Mr. Troy Samura of our Water Resources and Planning Branch at (808) 961-8070, extension 255.

Sincerely yours,

POJL

Keith K. Okamoto Manager-Chief Engineer

TS:dmj

copy – Planning Department DWS Cross Connection Section



March 14, 2023

County of Hawai'i Department of Water Supply 345 Kekūanaō'a Street, Suite 20 Hilo, HI 96720

# Subject:Response to Early Consultation Comments for the Hawaiian Kingdom<br/>Brands Draft Environmental Assessment (DEA)Applicant:Hawaiian Kingdom BrandsLocation:Waiākea Houselots, South Hilo, Hawai'iTMK:(3) 2-2-033: 011

#### Aloha,

Thank you for your comments dated April 21, 2022, in response to our early consultation request for the Hawaiian Kingdom Brands Draft Environmental Assessment. We acknowledge and accept your comments, which have been incorporated into the DEA. Please see below for our response to each concern and corresponding sections of the DEA to reference for more information.

- 1. Thank you for providing information regarding the current water availability to the site. HKB acknowledges that water is available from an existing 6-inch waterline within Pi'ilani Street fronting the subject property and that the parcel is served by an existing 5/8-inch meter (Account No. 100-65700), which is limited to a maximum daily usage of 600 gallons.
- 2. The applicant will submit estimated maximum daily water usage calculations, prepared by a professional engineer, licensed in the State of Hawai'i, for review and approval at the appropriate time. The water calculations will include the estimated peak flow in gallons per minute and the total estimated maximum daily water usage in gallons per day, including all irrigation use. The applicant acknowledges that DWS will use these calculations to determine the water commitment deposit and facilities charge and appropriate service lateral and meter size required.
- 3. The applicant acknowledges that the proposed zoning will require the installation of a reduced pressure type backflow prevention assembly, by a licensed contractor, within five (5) feet of the meter on private property. If a larger or additional meter is required, a backflow prevention assembly will also be required for that meter and the installation of the backflow prevention assembly must be inspected and approved by DWS before commencement of water service.



194 Wiwoʻole St. Hilo, HI 96720 (808) 333-3393 info@landplanninghawaii.com

- 4. The applicant accepts responsibility for the relocation and adjustment of the Department's water system facilities if they are affected by improvements within the road right-of-way fronting the property.
- 5. The applicant acknowledges that the existing 6-inch waterline within Pi'ilani Street and the existing 8-inch waterline within Manono Street are both inadequate to provide the required 2,000-gallons per minute of flow for fire protection, as per DWS Water System Standards. The applicant proposed to perform flow tests to confirm the actual flow rate near the subject property. The applicant will work with DWS and the Fire Department to determine acceptable means of fire protection. The bottling plant warehouse is proposed to be sprinklered.

Please review Section 3.3.2 and pages 116-118 for more details. Please feel free to contact me with any further comments or questions. Thank you very much.

Sincerely,

John Pipan Planning Administrator Land Planning Hawai'i LLC

Mitchell D. Roth Mayor

Lee E. Lord Managing Director

West Hawai'i Office 74-5044 Ane Keohokālole Hwy Kailua-Kona, Hawai'i 96740 Phone (808) 323-4770 Fax (808) 327-3563

July 7, 2022

John Pipan Land Planning Hawaii, LLC 194 Wiwoʻole St. Hilo, HI 96720

Dear Mr. Pipan:

SUBJECT:	Early Request for Comments for Draft Environmental Assessment (DEA) (PL-INT-2022-001968)							
	Landowner:	Talon 1 Properties, LLC						
	Subject:	Proposed Warehouse/Manufacturing Plant for Coffee						
		Ū.	Product and Water Bottling, Water Well, and					
		Café/Restaurant						
	TMK:	(3) 2-2-033:011. South Hilo District. Island of Hawai'i						

County of Hawai'i

PLANNING DEPARTMENT

This letter is in response to your inquiry regarding a proposal to develop a warehouse/manufacturing plant, water well, and café/restaurant on the subject parcel, all of which is located within the County of Hawai'i Special Management Area (SMA). While the proposed project is a permitted use in the County ML-20 (limited industrial) zoning district and State Land Use Urban District, the use will require the approval of a SMA Use Permit (SMA Major).

#### **Previous SMA determinations:**

- SMA Major Permit (SMA 334) was approved in 1992 for a fish processing center but has since been revoked (by the applicant) and is no longer viable.
- SMA Use permit application (SMA-18-000070) was submitted in 2018 to develop a potable water well and bottling facility with related improvements. The project was not realized due to issues with site resources, and as such, we recommend reviewing that file prior to submitting the DEA.
- SMA minor permit (PL-SMM-2022-000012) was provided on January 16, 2022, to the current applicant for land management activities.



Zendo Kern Director

Jeffrey W. Darrow Deputy Director

East Hawai'i Office 101 Pauahi Street, Suite 3 Hilo, Hawai'i 96720 Phone (808) 961-8288 Fax (808) 961-8742
John Pipan Land Planning Hawaii, LLC July 7, 2022 Page 2

Staff notes, that the forthcoming Final Environmental Assessment (FEA) may be used as the application for the SMA Major Permit, if it meets the application criteria in Planning Commission Rule 9 and includes a thorough discussion section on the SMA criteria, in conformance with Planning Commission Rule 9-10(h), *Criteria of Substantial Adverse Effect*.

#### Additional comments on the proposed project:

- Plan Approval (PA) will be required for the proposed project.
- The Planning Department may ask that the portion of Pi'ilani Street, fronting the project site, be improved to commercial/industrial standards. Please discuss access, roadway improvements, etc., including the possibility of improving Mililani Street to access the property.
- A drainage system, including measures to control stormwater runoff, should be included to minimize impacts to the nearby pond.
- Please describe specific construction related best management practices (BMPs) to control runoff and soil loss from the proposed development.

We look froward to reviewing the Draft EA when it is published. If you have any questions, please feel free to contact Alex Roy of this department at (808) 961-8140 or via email at <u>Alex.Roy@hawaiicounty.gov</u>.

Sincerely,

Teffrey W. Darrow

JEFFREY W. DARROW Deputy Planning Director

AJR:jaa

 $\label{eq:consult_001} \label{eq:consult_001.doc} \label{eq:consult_001.d$ 

Mitchell D. Roth Mayor



Paul K. Ferreira Police Chief

Kenneth Bugado Jr. Deputy Police Chief

# **County of Hawai`i**

 POLICE
 DEPARTMENT

 349 Kapi'olani Street
 • Hilo, Hawai'i 96720-3998

 (808) 935-3311
 • Fax (808) 961-2389

April 12, 2022

Land Planning Hawaii LLC Attention: Mr. John Pipan 194 Wiwo'ole Street Hilo, HI 96720

Dear Mr. Pipan,

SUBJECT: EARLY REQUEST FOR COMMENT FOR A DRAFT ENVIRONMENTAL ASSESSMENT REGARDING PROPOSED WAREHOUSE/MANUFACTURING PLANT AND CAFÉ/RESTAURANT BY HAWAIIAN KINGDOM BRANDS, WAIAKEA HOUSELOTS; TMK: (3) 2-2-033:011

Staff, upon reviewing the provided documents, does not anticipate any significant impact to traffic and/or public safety concerns.

Thank you for allowing us the opportunity to comment.

If you have any questions, please contact Captain Sandor Finkey of the Hilo Patrol Division, at 961-2214 or via e-mail at sandor.finkey@hawaiicounty.gov.

Sincerely,

ASSISTANT POLICE CHIEF **AREA I OPERATIONS** 

SF:IIi/22HQ0415

"Hawai'i County is an Equal Opportunity Provider and Employer"

Mitchell D. Roth Mayor

> Lee E. Lord Managing Director



Kazuo S. K. L. Todd Fire Chief

> Eric H. Moller Deputy Fire Chief

# **County of Hawai'i HAWAI'I FIRE DEPARTMENT** 25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720 (808) 932-2900 • Fax (808) 932-2928

April 25, 2022

John Pipan, Planning Administrator Land Planning Hawaii, LLC 194 Wiwo'ole St. Hilo, Hawai'i 96720

Dear Mr. Pipan,

SUBJECT:	Correction to Early Request for Comment for a Draft Environmental
	Assessment
RE:	Proposed Warehouse/Manufacturing Plant and Café/Restaurant
Applicant:	Hawaiian Kingdom Brands
Location:	Waiakea Houselots, South Hilo, Hawai'i TMK: (3) 2-2-033: 011
	Pre-Assessment Consultation for Draft Environmental Assessment

In regard to the above-referenced subject, the following shall be in accordance:

# NFPA 1, UNIFORM FIRE CODE, 2006 EDITION

Note: Hawai'i State Fire Code, National Fire Protection Association 2006 version, with County of Hawai'i amendments. County amendments are identified with a preceding "C~" of the reference code.

Chapter 18 Fire Department Access and Water Supply

18.1 General. Fire department access and water supplies shall comply with this chapter.

For occupancies of an especially hazardous nature, or where special hazards exist in addition to the normal hazard of the occupancy, or where access for fire apparatus is unduly difficult, or areas where there is an inadequate fire flow, or inadequate fire hydrant spacing, and the AHJ may require additional safeguards including, but not limited to, additional fire appliance units, more than one type of appliance, or special systems suitable for the protection of the hazard involved.



#### 18.1.1 Plans.

**18.1.1.1 Fire Apparatus Access**. Plans for fire apparatus access roads shall be submitted to the fire department for review and approval prior to construction.

**18.1.1.2 Fire Hydrant Systems**. Plans and specifications for fire hydrant systems shall be submitted to the fire department for review and approval prior to construction.

 $C \sim 18.1.1.2.1$  Fire Hydrant use and Restrictions. No unauthorized person shall use or operate any Fire hydrant unless such person first secures permission or a permit from the owner or representative of the department, or company that owns or governs that water supply or system. Exception: Fire Department personnel conducting firefighting operations, hydrant testing, and/or maintenance, and the flushing and acceptance of hydrants witnessed by Fire Prevention Bureau personnel.

#### **18.2 Fire Department Access.**

**18.2.1** Fire department access and fire department access roads shall be provided and maintained in accordance with Section 18.2.

# 18.2.2\* Access to Structures or Areas.

**18.2.2.1** Access Box(es). The AHJ shall have the authority to require an access box(es) to be installed in an accessible location where access to or within a structure or area is difficult because of security.

**18.2.2.2** Access to Gated Subdivisions or Developments. The AHJ shall have the authority to require fire department access be provided to gated subdivisions or developments through the use of an approved device or system.

**18.2.2.3** Access Maintenance. The owner or occupant of a structure or area, with required fire department access as specified in 18.2.2.1 or 18.2.2.2, shall notify the AHJ when the access is modified in a manner that could prevent fire department access.

# 18.2.3 Fire Department Access Roads. (\*may be referred as FDAR)

#### 18.2.3.1 Required Access.

**18.2.3.1.1** Approved fire department access roads shall be provided for every facility, building, or portion of a building hereafter constructed or relocated.

**18.2.3.1.2** Fire Department access roads shall consist of roadways, fire lanes, parking lots lanes, or a combination thereof.

**18.2.3.1.3\*** When not more than two one- and two-family dwellings or private garages, carports, sheds, agricultural buildings, and detached buildings or structures 400 ft<sup>2</sup> (37 m<sup>2</sup>) or less are present, the requirements of 18.2.3.1 through 18.2.3.2.1 shall be permitted to be modified by the AHJ.

**18.2.3.1.4** When fire department access roads cannot be installed due to location on property, topography, waterways, nonnegotiable grades, or other similar conditions, the AHJ shall be authorized to require additional fire protection features.

# 18.2.3.2 Access to Building.

**18.2.3.2.1** A fire department access road shall extend to within in 50 ft (15 m) of at least one exterior door that can be opened from the outside that provides access to the interior of the building. Exception: 1 and 2 single-family dwellings.

**18.2.3.2.1.1** When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.1 shall be permitted to be increased to 300 feet.

**18.2.3.2.2** Fire department access roads shall be provided such that any portion of the facility or any portion of an exterior wall of the first story of the building is located not more than 150 ft (46 m) from fire department access roads as measured by an approved route around the exterior of the building or facility.

**18.2.3.2.1** When buildings are protected throughout with an approved automatic sprinkler system that is installed in accordance with NFPA 13, NFPA 13D, or NFPA 13R, the distance in 18.2.3.2.2 shall be permitted to be increased to 450 ft (137 m).

**18.2.3.3 Multiple Access Roads.** More than one fire department access road shall be provided when it is determined by the AHJ that access by a single road could be impaired by vehicle congestion, condition of terrain, climatic conditions, or other factors that could limit access.

#### 18.2.3.4 Specifications.

#### **18.2.3.4.1** Dimensions.

 $C \sim 18.2.3.4.1.1$  FDAR shall have an unobstructed width of not less than 20ft with an approved turn around area if the FDAR exceeds 150 feet. Exception: FDAR for one- and two-family dwellings shall have an unobstructed width of not less than 15 feet, with an area of not less than

20 feet wide within 150 feet of the structure being protected. An approved turn around area shall be provided if the FDAR exceeds 250 feet.

C~ 18.2.3.4.1.2 FDAR shall have an unobstructed vertical clearance of not less than 13ft 6 in.

 $C \sim 18.2.3.4.1.2.1$  Vertical clearances may be increased or reduced by the AHJ, provided such increase or reduction does not impair access by the fire apparatus, and approved signs are installed and maintained indicating such approved changes.

**18.2.3.4.1.2.2** Vertical clearances shall be increased when vertical clearances or widths are not adequate to accommodate fire apparatus.

 $C \sim 18.2.3.4.2$  Surface. Fire department access roads and bridges shall be designed and maintained to support the imposed loads (25 Tons) of the fire apparatus. Such FDAR and shall be comprised of an all-weather driving surface.

#### 18.2.3.4.3 Turning Radius.

 $C \sim 18.2.3.4.3.1$  Fire department access roads shall have a minimum inside turning radius of 30 feet, and a minimum outside turning radius of 60 feet.

18.2.3.4.3.2 Turns in fire department access road shall maintain the minimum road width.

**18.2.3.4.4 Dead Ends**. Dead-end fire department access roads in excess of 150 ft (46 m) in length shall be provided with approved provisions for the fire apparatus to turn around.

# 18.2.3.4.5 Bridges.

**18.2.3.4.5.1** When a bridge is required to be used as part of a fire department access road, it shall be constructed and maintained in accordance with county requirements.

**18.2.3.4.5.2** The bridge shall be designed for a live load sufficient to carry the imposed loads of fire apparatus.

**18.2.3.4.5.3** Vehicle load limits shall be posted at both entrances to bridges where required by the AHJ.

# 18.2.3.4.6 Grade.

 $C \sim 18.2.3.4.6.1$  The maximum gradient of a Fire department access road shall not exceed 12 percent for unpaved surfaces and 15 percent for paved surfaces. In areas of the FDAR where a

Fire apparatus would connect to a Fire hydrant or Fire Department Connection, the maximum gradient of such area(s) shall not exceed 10 percent.

**18.2.3.4.6.2\*** The angle of approach and departure for any means of fire department access road shall not exceed 1 ft drop in 20 ft (0.3 m drop in 6 m) or the design limitations of the fire apparatus of the fire department and shall be subject to approval by the AHJ.

**18.2.3.4.6.3** Fire department access roads connecting to roadways shall be provided with curb cuts extending at least 2 ft (0.61 m) beyond each edge of the fire lane.

**18.2.3.4.7 Traffic Calming Devices.** The design and use of traffic calming devices shall be approved the AHJ.

# 18.2.3.5 Marking of Fire Apparatus Access Road.

**18.2.3.5.1** Where required by the AHJ, approved signs or other approved notices shall be provided and maintained to identify fire department access roads or to prohibit the obstruction thereof of both.

**18.2.3.5.2** A marked fire apparatus access road shall also be known as a fire lane.

# 18.2.4\* Obstruction and Control of Fire Department Access Road.

# 18.2.4.1 General.

**18.2.4.1.1** The required width of a fire department access road shall not be obstructed in any manner, including by the parking of vehicles.

**18.2.4.1.2** Minimum required widths and clearances established under 18.2.3.4 shall be maintained at all times.

**18.2.4.1.3**\* Facilities and structures shall be maintained in a manner that does not impair or impede accessibility for fire department operations.

**18.2.4.1.4** Entrances to fire departments access roads that have been closed with gates and barriers in accordance with 18.2.4.2.1 shall not be obstructed by parked vehicles.

# 18.2.4.2 Closure of Accessways.

**18.2.4.2.1** The AHJ shall be authorized to require the installation and maintenance of gates or other approved barricades across roads, trails, or other accessways not including public streets, alleys, or highways.

**18.2.4.2.2** Where required, gates and barricades shall be secured in an approved manner.

**18.2.4.2.3** Roads, trails, and other access ways that have been closed and obstructed in the manner prescribed by 18.2.4.2.1 shall not be trespassed upon or used unless authorized by the owner and the AHJ.

**18.2.4.2.4** Public officers acting within their scope of duty shall be permitted to access restricted property identified in 18.2.4.2.1.

**18.2.4.2.5** Locks, gates, doors, barricades, chains, enclosures, signs, tags, or seals that have been installed by the fire department or by its order or under its control shall not be removed, unlocked, destroyed, tampered with, or otherwise vandalized in any manner.

#### 18.3 Water Supplies and Fire Hydrants

**18.3.1\*** A water supply approved by the county, capable of supplying the required fire flow for fire protection shall be provided to all premises upon which facilities or buildings, or portions thereof, are hereafter constructed, or moved into or within the county. When any portion of the facility or building is in excess of 150 feet (45 720 mm) from a water supply on a fire apparatus access road, as measured by an approved route around the exterior of the facility or building, onsite fire hydrants and mains capable of supplying the required fire flow shall be provided when required by the AHJ. For on-site fire hydrant requirements see section 18.3.3.

#### **EXCEPTIONS:**

- 1. When facilities or buildings, or portions thereof, are completely protected with an approved automatic fire sprinkler system the provisions of section 18.3.1 may be modified by the AHJ.
- 2. When water supply requirements cannot be installed due to topography or other conditions, the AHJ may require additional fire protection as specified in section 18.3.2 as amended in the code.
- 3. When there are not more than two dwellings, or two private garages, carports, sheds and agricultural. Occupancies, the requirements of section 18.3.1 may be modified by AHJ.

**18.3.2\*** Where no adequate or reliable water distribution system exists, approved reservoirs, pressure tanks, elevated tanks, fire department tanker shuttles, or other approved systems capable of providing the required fire flow shall be permitted.

**18.3.3**\* The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be provided on a fire apparatus access road on the site of the premises or both, in accordance with the appropriate county water requirements.

**18.3.4** Fire Hydrants and connections to other approved water supplies shall be accessible to the fire department.

**18.3.5** Private water supply systems shall be tested and maintained in accordance with NFPA 25, or county requirements as determined by the AHJ.

**18.3.6** Where required by the AHJ, fire hydrants subject to vehicular damage shall be protected unless located within a public right of way.

**18.3.7** The AHJ shall be notified whenever any fire hydrant is placed out of service or returned to service. Owners of private property required to have hydrants shall maintain hydrant records of approval, testing, and maintenance, in accordance with the respective county water requirements. Records shall be made available for review by the AHJ upon request.

 $C \sim 18.3.8$  Minimum water supply for buildings that do not meet the minimum County water standards:

Buildings up to 2000 square feet, shall have a minimum of 3,000 gallons of water available for Firefighting.

Buildings, 2001- 3000 square feet, shall have a minimum of 6,000 gallons of water available for Firefighting.

Buildings, 3001- 6000 square feet, shall have a minimum of 12,000 gallons of water available for Firefighting.

Buildings, greater than 6000 square feet, shall meet the minimum County water and fire flow requirements.

Multiple story buildings shall multiply the square feet by the amount of stories when determining the minimum water supply.

Commercial buildings requiring a minimum fire flow of 2000gpm per the Department of Water standards shall double the minimum water supply reserved for firefighting.

Fire Department Connections (FDC) to alternative water supplies shall comply with 18.3.8 (1)-(6) of *this code*.

NOTE: In that water catchment systems are being used as a means of water supply for firefighting, such systems shall meet the following requirements:

- 1) In that a single water tank is used for both domestic and firefighting water, the water for domestic use shall not be capable of being drawn from the water reserved for firefighting.
- 2) Minimum pipe diameter sizes from the water supply to the Fire Department Connection (FDC) shall be as follows:
  - a) 4" for C900 PVC pipe.
  - b) 4" for C906 PE pipe.
  - c) 3" for ductile Iron.
  - d) 3' for galvanized steel.
- 3) The Fire Department Connection (FDC) shall:
  - a) be made of galvanized steel.
  - b) have a gated valve with 2-1/2-inch, National Standard Thread male fitting and cap.
  - c) be located between 8 ft and 16 ft from the Fire department access. The location shall be approved by the AHJ.
  - d) not be located less than 24 inches, and no higher than 36 inches from finish grade, as measured from the center of the FDC orifice.
  - e) be secure and capable of withstanding drafting operations. Engineered stamped plans may be required.
  - f) not be located more than 150 feet of the most remote part, but not less than 20 feet, of the structure being protected.
  - g) also comply with section 13.1.3 and 18.2.3.4.6.1 of *this code*.
- 4) Commercial buildings requiring a fire flow of 2000gpm shall be provided with a second FDC. Each FDC shall be independent of each other, with each FDC being capable of flowing 500gpm by engineered design standards. The second FDC shall be located in an area approved by the AHJ with the idea of multiple Fire apparatus' conducting drafting operations at once, in mind.
- 5) Inspection and maintenance shall be in accordance with NFPA 25.
- 6) The owner or lessee of the property shall be responsible for maintaining the water level, quality, and appurtenances of the system.

#### **EXCEPTIONS TO SECTION 18.3.8:**

- 1) Agricultural buildings, storage sheds, and shade houses with no combustible or equipment storage.
- 2) Buildings less than 800 square feet in size that meets the minimum Fire Department Access Road requirements.

- For one- and two-family dwellings, agricultural buildings, storage sheds, and detached garages 800 to 2000 square feet in size, and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 1000 feet.
- 4) For one- and two-family dwellings, agricultural buildings, and storage sheds greater than 2000square feet, but less than 3000 square feet and meets the minimum Fire Department Access Road requirements, the distance to the Fire Department Connection may be increased to 500 feet.
- 5) For buildings with an approved automatic sprinkler system, the minimum water supply required may be modified.

If there are any questions regarding these requirements, please contact Acting Battalion Chief Palani Kurashige at (808) 932-2912.

KAZUO S. K. L. TODD Fire Chief

KT:lk

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

Apr 14, 2022

#### MEMORANDUM

TO:

DLNR Agencies:

X Div. of Aquatic Resources (<u>kendall.l.tucker@hawaii.gov</u>) X Div. of Boating & Ocean Recreation (<u>richard.t.howard@hawaii.gov</u>) X Engineering Division (<u>DLNR.ENGR@hawaii.gov</u>) X Div. of Forestry & Wildlife (<u>rubyrosa.t.terrago@hawaii.gov</u>) X Div. of State Parks (<u>curt.a.cottrell@hawaii.gov</u>) X Commission on Water Resource Management (<u>DLNR.CWRM@hawaii.gov</u>) Office of Conservation & Coastal Lands (<u>sharleen.k.kuba@hawaii.gov</u>) X Land Division – Hawaii District (<u>gordon.c.heit@hawaii.gov</u>)

FROM:Russell Y. Tsuji, Land Administrator Russell TsujiSUBJECT:Early Request for Comment for a Draft Environmental Assessment for the<br/>Proposed Warehouse/Manufacturing Plant and Café/RestaurantLOCATION:Waiakea Houselots, South Hilo, Island of Hawaii; TMK: (3) 2-2-033:011<br/>Land Planning Hawaii LLC on behalf of Hawaiian Kingdom Brands

Transmitted for your review and comment is information on the above-referenced subject matter. Please submit comments by **May 9, 2022**.

If no response is received by the above date, we will assume your agency has no comments. Should you have any questions about this request, please contact Darlene Nakamura at <u>darlene.k.nakamura@hawaii.gov</u>. Thank you.

**BRIEF COMMENTS:** 

) We have no objections.

We have no comments.

) We have no additional comments.

() Comments are included/attached.

Signed: Print Name: Division: Date:

Attachments cc: Central Files