DHHL EAST MAKA‘ALA MIXED USE DEVELOPMENT

TMK (3) 2-2-47: 072
Hilo, Hawai‘i

Final ~~Draft~~ Environmental Assessment/Finding of No Significant Impact (FONSI)

Proposing Agency ~~Applicant:~~
Department of Hawaiian Home Lands
Land Management Division
P.O. Box 1879
Honolulu, HI 96707

Prepared by:
Group 70 International, Inc.
Architecture • Planning & Environmental Services • Interior Design • Assets Management
Honolulu, Hawai‘i

April 2009 ~~December 2008~~

LINDA LINGLE
GOVERNOR
STATE OF HAWAI'I

MICAH A. KĀNE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

KA'ULANA H. PARK
DEPUTY TO THE CHAIRMAN

ROBERT J. HALL
EXECUTIVE ASSISTANT

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879
HONOLULU, HAWAI'I 96805

April 22, 2009

Ms. Katherine Puana Kealoha, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaiÿi 96813

Dear Ms. Kealoha,

Re: Finding of No Significant Impact (FONSI), Final Environmental Assessment, DHHL East Makaala Mixed Use Development, TMK (3) 2-2-047:072, Hilo, Hawaii

The State of Hawaii, Department of Hawaiian Home Lands, Hawaiian Homes Commission has reviewed the comments received during the 30-day public comment period which began on January 8, 2009. The Hawaiian Homes Commission has determined that this project will not have significant environmental effects and has issued a FONSI.

Please publish notice of availability for this project in the next available OEQC Environmental Notice. We have enclosed a completed OEQC Publication Form, one copy of the document in pdf format, two copies of the Final EA, and the project summary on disk.

If you have any questions regarding the project, please contact Peter "Kahana" Albinio, Jr., Property Development Agent, at 808.620.9454 or email peter.k.albinio.jr@hawaii.gov.

Aloha and mahalo,

Micah Kane, Chairman
Hawaiian Homes Commission

Enc.

DHHL EAST MAKA‘ALA MIXED USE DEVELOPMENT

TMK (3) 2-2-47: 072
Hilo, Hawai‘i

Final ~~Draft~~ Environmental Assessment/Finding of No Significant Impact (FONSI)

This environmental document is prepared in accordance with the requirements of Chapter 343, HRS and Hawai‘i Administrative Rules, Title 11, Department of Health.

Proposing Agency ~~Applicant~~:
Department of Hawaiian Home Lands
Land Management Division
P.O. Box 1879
Honolulu, HI 96822

Determining ~~Accepting~~ Authority:
Hawaiian Homes ~~Lands~~ Commission
P.O. Box 1879
Honolulu, Hawai‘i 96822

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April 2009 ~~**December 2008**~~

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1.0 INTRODUCTION

1.0 INTRODUCTION

This Final ~~Draft~~ Environmental Assessment (EA) has been prepared in accordance with the requirements of Chapter 343, HRS and Hawai'i Administrative Rules, Title 11, Department of Health, which set forth the requirements for the preparation of environmental assessments.

1.1 PROJECT INFORMATION SUMMARY

Type of Application: Environmental Assessment (EA). Chapter 343, Hawaii Revised Statues compliance

Project Name: DHHL East Maka'ala Mixed Use Development

Proposing Agency ~~Applicant~~: ~~Ms. Linda Chinn, Administrator~~
State of Hawai'i
Department of Hawaiian Home Lands
Land Management Division
P.O. Box 1879
Honolulu, HI 96707
Telephone: (808) 587-6429
~~Email: Linda.Chinn@hawaii.gov~~

Authorized Agent: Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813
Contact Person: George Atta, AICP
Telephone: (808) 523-5866
Email: EastMakaalaEA@group70int.com

Determining ~~Accepting~~ Authority: Hawaiian Homes ~~Lands~~ Commission

Proposed Project: Industrial / Mixed Use Development

Location: Northwestern corner of Maka'ala Street and Railroad Avenue, Pana'ewa Tract 1, Waiākea, South Hilo, Island of Hawai'i *(Figure 1.1).*

Tax Map Key (3) 2-2-47: 072. Previously noted as (3) 2-2-47: 59 Lot 5-A-1. (Figure 1.2)

Project Land Area: 15.574 acres (678, 403 square feet)

Existing Use: Light Industrial use. The parcel is improved with a number of older industrial structures and was recently utilized as a temporary base yard during construction of nearby Home Depot Store.

Proposed Use:	Commercial/Industrial Mixed Use Development (MCX).
State Land Use District:	Urban *(Figure 1.3)*
Hawai'i County Land Use Pattern Allocation Guide (LUPAG):	**High Density Urban (*Figure 1.45*)**
Existing County Zoning:	MG-1 General Industrial but will be valued as if it had an Industrial / Commercial mixed use zoning. DHHL plans to designate this site for development under MCX guidelines for planning and permitting purposes. *(Figure 1.54)*
~~**Hawai'i County Land Use Pattern Allocation Guide (LUPAG):**~~	~~High Density Urban *(Figure 1.5)*~~
Special Management Area District:	The property is not in the SMA district.
Flood Zone Designation:	FIRM Zone X, Areas outside the 500-year flood plain *(Figure 1.6).*
Permits Required:	Chapter 343, HRS compliance; Grading/ Building Permits; Driveway connection to County road; Water; National Pollutant Discharge; Elimination System (NPDES)
~~**Anticipated** **Determination:**	Finding of No Significant Impact (FONSI)

1.2 PROJECT SITE

The State of Hawai'i Department of Hawaiian Home Lands (DHHL) East Maka'ala Mixed Use Development will be located on an approximately fifteen-acre site owned by DHHL. The site is at the Northwestern corner of Maka'ala Street and Railroad Avenue across from The Home Depot and Wal-Mart in Pana'ewa Tract 1, Waiākea, South Hilo, within the County of Hawai'i *(Figure 1.1)*. The property is identified as TMK 2-2-47:072 *(Figure 1.2)*.

The property is presently developed with a number of older, industrial structures and was also recently utilized as a temporary base yard during the construction period of the nearby Home Depot Store. The property contains 678,403 square feet (15.574 acres) of gross land area. It is generally square-shaped, with an irregularly shaped northern boundary and extensive roadway frontage and exposure along both Maka'ala Street and Railroad Avenue. The site is generally level at surrounding street elevations and appears to have been cleared and graded in the past. Photos of the existing site are provided in this report.

1.3 OVERVIEW OF PROPOSED PROJECT

The Department of Hawaiian Home Lands has entered into negotiations for a joint lease agreement with Target Corporation and Safeway Inc. for the construction, operation,

management of an industrial/ commercial mixed-use development and related facilities on 15.5 acres of Hawaiian Home Lands at the corner of East Maka'ala Street and Railroad Avenue, in South Hilo, Hawai'i.

Public Auction for these approximately 15.574 acres (678,403 square feet) of Hawaiian home lands was offered for a general lease disposition with a minimum term of twenty-five (25) years. The call for bidding began on June 13, 2008. The site was designated for Industrial/Commercial Mixed Use in the bid information. Applicants that met DHHL's qualifications had until September 26, 2008, to turn in their sealed rent bids and a deposit. The bids were opened on October 17, 2008, with the winning bid submitted by Target Corporation and Safeway Inc. as joint developers.

The lease period is fixed for the first 25 years and will be renegotiated for the remainder of the term. The property will be leased for $586,460 per year for the first decade and then rises every five years to $727,686, $823,304, and then tops out at $931,486 from the 21st to the 25th year. The project as proposed is expected to generate $18.1 million over the next 25 years. Rent after the 25th year will be determined on a decadal basis, if the lease is to be extended to 65 years. The final terms of the lease will be negotiated by early 2009.

The proposed project will create 220,000 square feet (sf) of mixed industrial commercial use consisting of a 160,000 sf general merchandise store (Target) and a 60,000 sf grocery supermarket (Safeway). Approximately 712 parking stalls for personal use vehicles will be provided. Driveway access to the parking lot will be from both Railroad Avenue and East Maka'ala Street with an additional service lane for service vehicles on Railroad Avenue. Landscaping will be provided per code. While final site plans have not been developed, *Figure 1.7* is a conceptual site plan that depicts a likely development scenario for the site.

This environmental assessment is required before the start of any demolition or construction activity on the site.

1.4 CONTENTS OF ENVIRONMENTAL ASSESSMENT

This report is being prepared in accordance with the procedural requirements and steps set forth in Chapter 343 Hawai'i Revised Statutes (HRS), and in the State of Hawai'i Administrative Rules, Title 11, Department of Health.

The EA report will be presented in eight sections. General information on the proposed project, as summarized in this package, will be presented in *Section 1*. *Section 2* will present a detailed description of the project, including site characteristics, proposed construction, anticipated use/ occupancy levels, estimated project costs, anticipated construction schedules, and required land use approvals. *Section 3* will describe the environment setting, potential impacts and mitigation measures. Description and an analysis of alternatives will be provided in *Section 4*. *Section 5* will relate the proposed project to existing State and County of Hawai'i plans and policies. The anticipated determination of impact and reasons in support of this finding will be presented in *Section 6*. *Section 7* will list the agencies and organizations that will receive copies of the Final ~~Draft~~ EA. A list of references will be provided in *Section 8*.

1.5 AGENCIES, ORGANIZATIONS AND INDIVIDUALS CONTACTED DURING THE PRE-CONSULTATION AND PUBLIC REVIEW PROCESS

The following government agencies, elected officials and community organizations have been contacted as part of the EA pre-assessment consultation and public review process:

State of Hawai'i Agencies and Elected Officials
Office of Environmental Quality Control
Department of Transportation
Department of Business, Economic Development & Tourism, Office of Planning
Department of Land and Natural Resources,
- Land Division
- Office of Conservation and Coastal Lands
- State Historic Preservation Division

Department of Health, Environmental Planning
Office of Hawaiian Affairs
University of Hawai'i Environmental Center
State Senator Senate District 1
State Representative Jerry Chang House District 2

County of Hawai'i Agencies and Elected Officials:
Office of the Mayor
Planning Department
Department of Environmental Services
Department of Water Supply
Public Works
Fire Department
Police Department
Hawai'i County Council District 4.

Community Organizations and Businesses:
Pana'ewa Hawaiian Homes Community Association
Hawai'i Chamber of Commerce
HELCO
Sandwich Isle Communication
Sierra Club

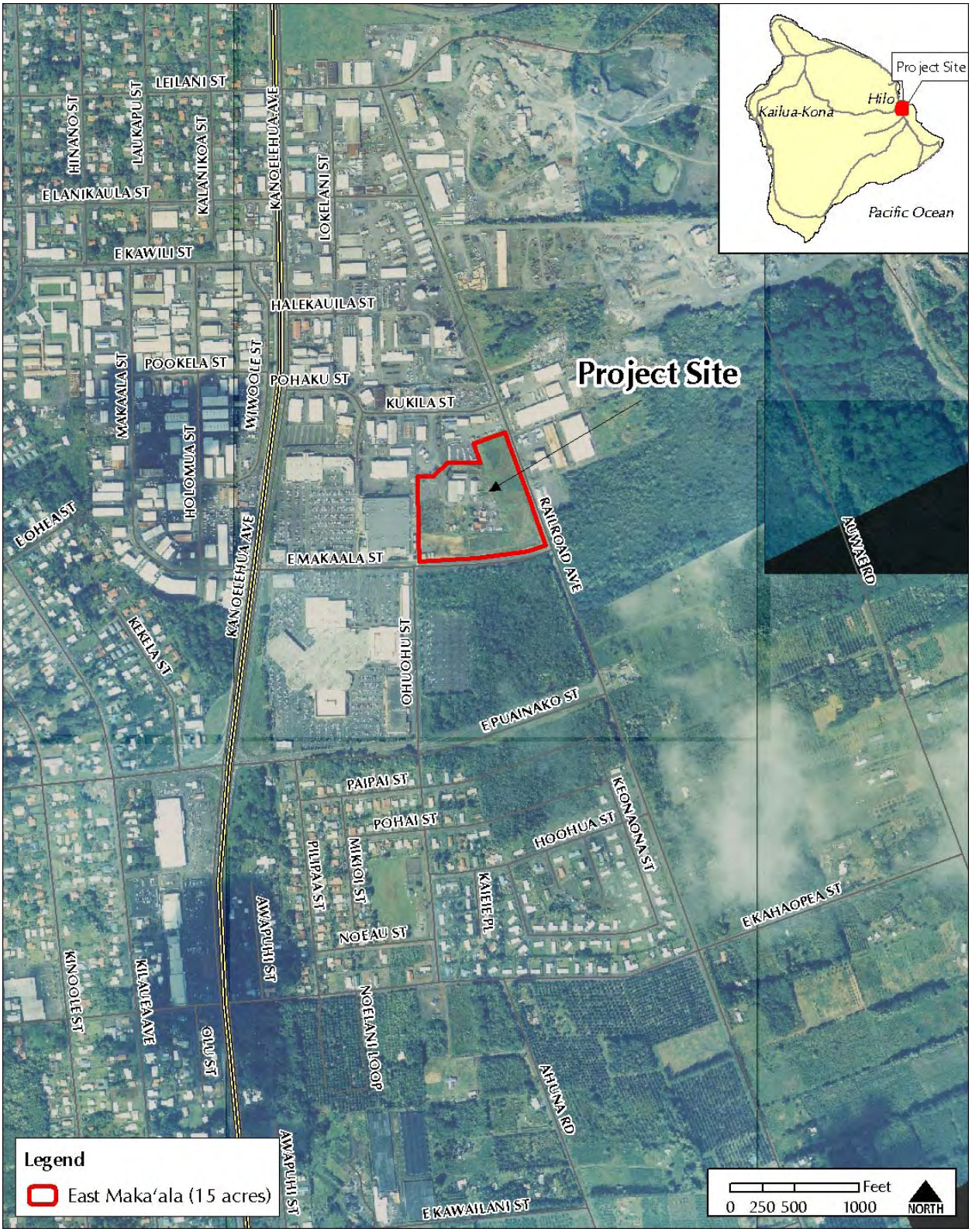

Figure 1.1 Project Location

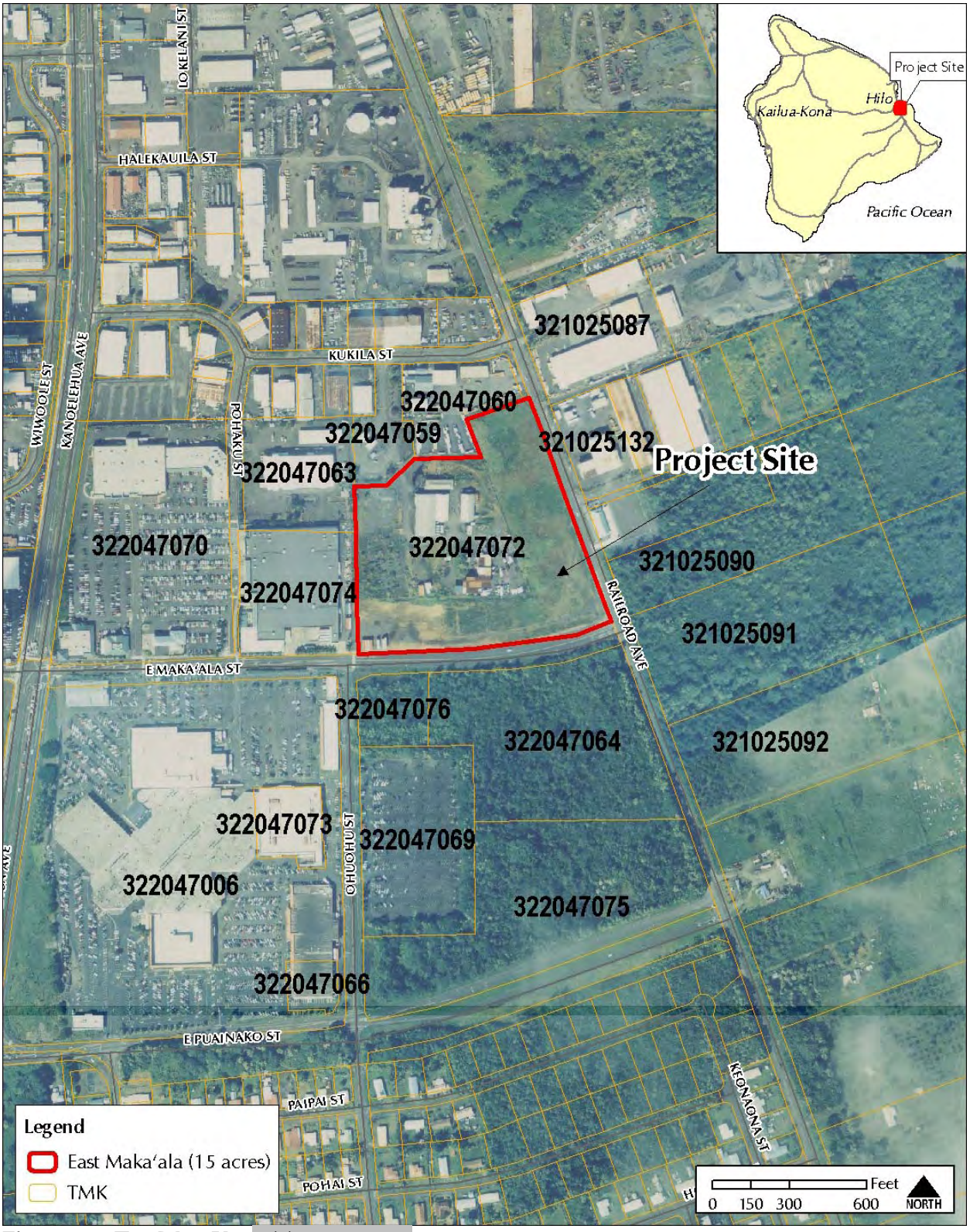

Figure 1.2 Tax Map Key: (3) 2-2-047:072

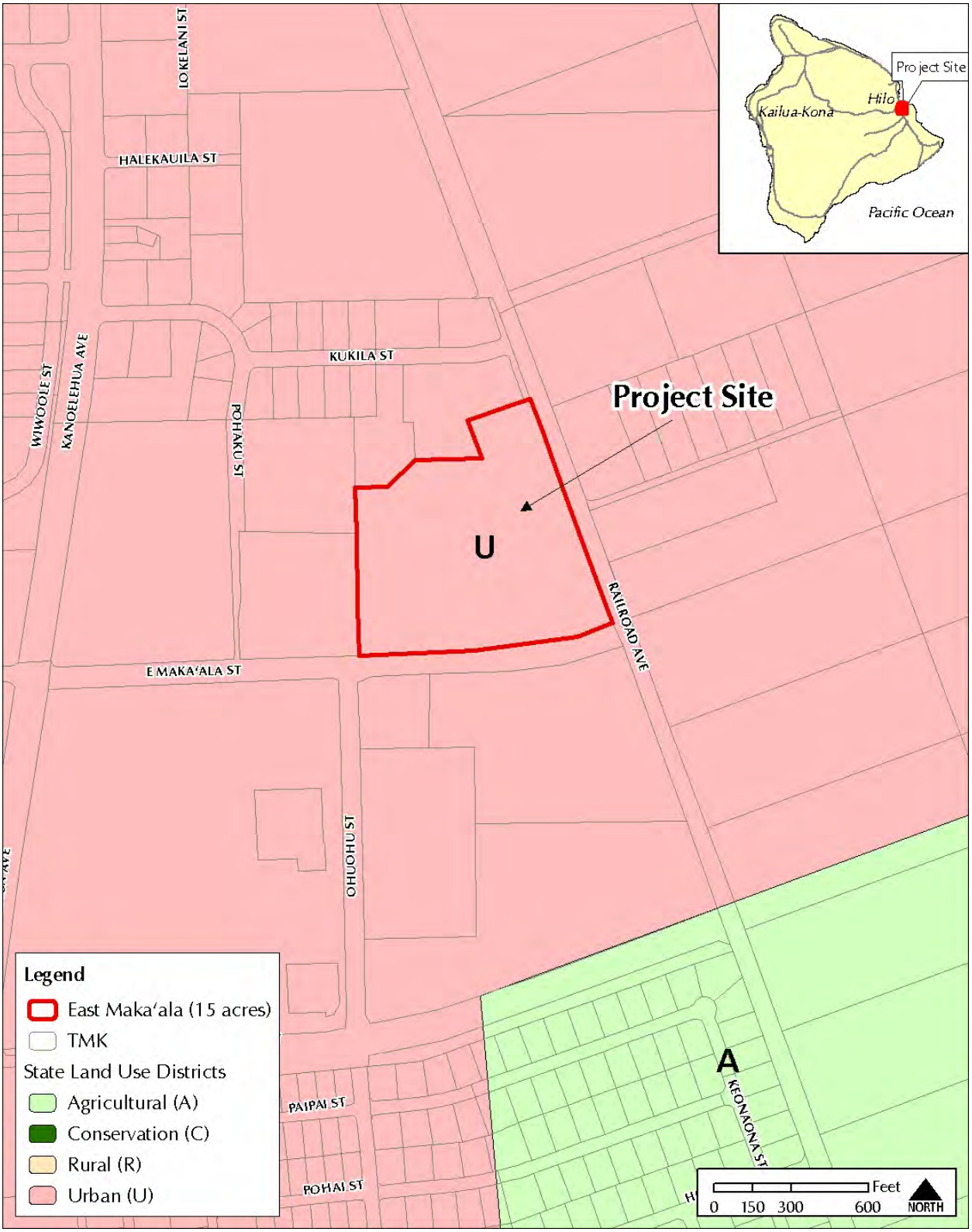

Figure 1.3 State Land Use Designation Map

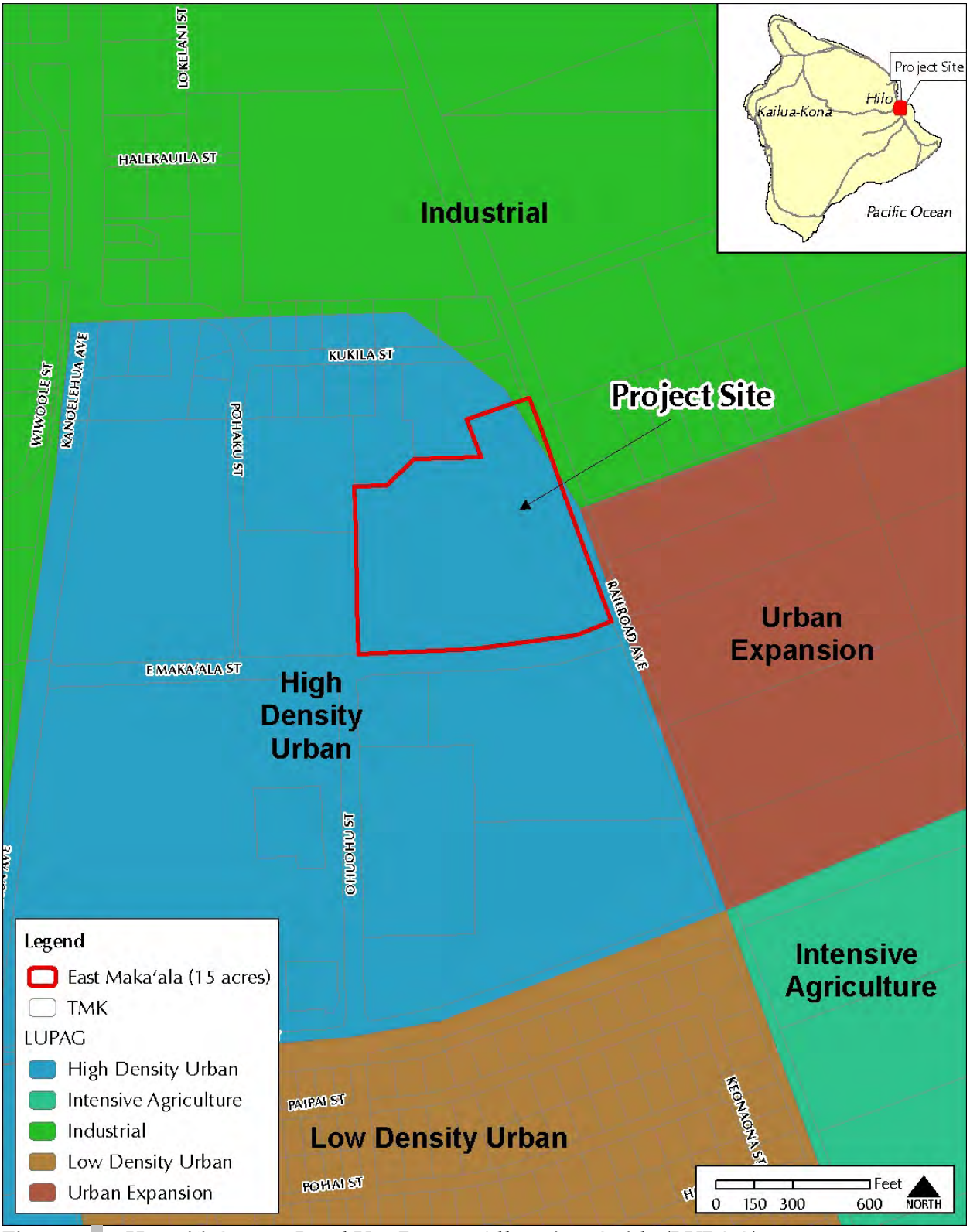

Figure 1.~~4~~5 Hawai'i County Land Use Pattern Allocation Guide (LUPAG)

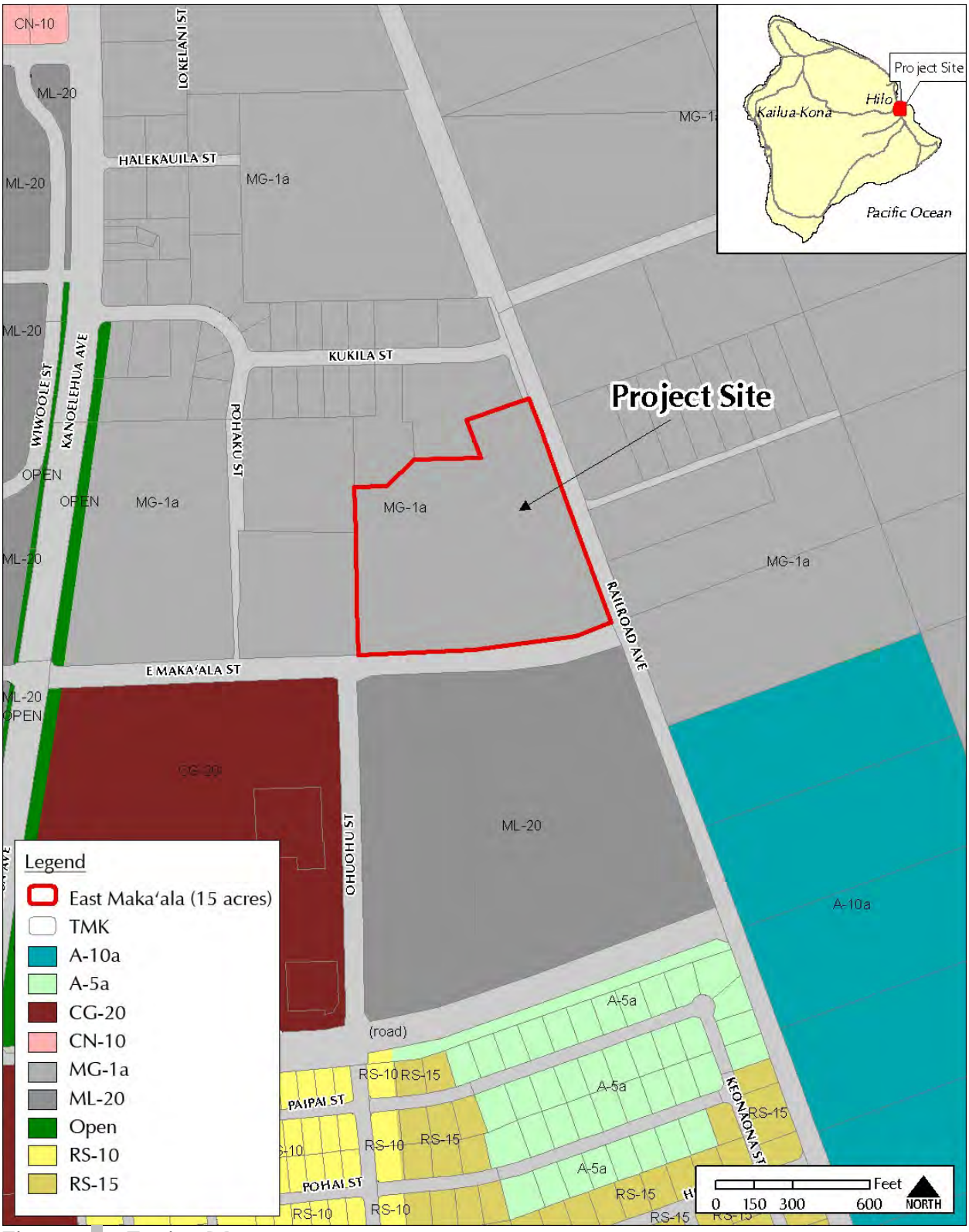

Figure 1.54 Zoning Map

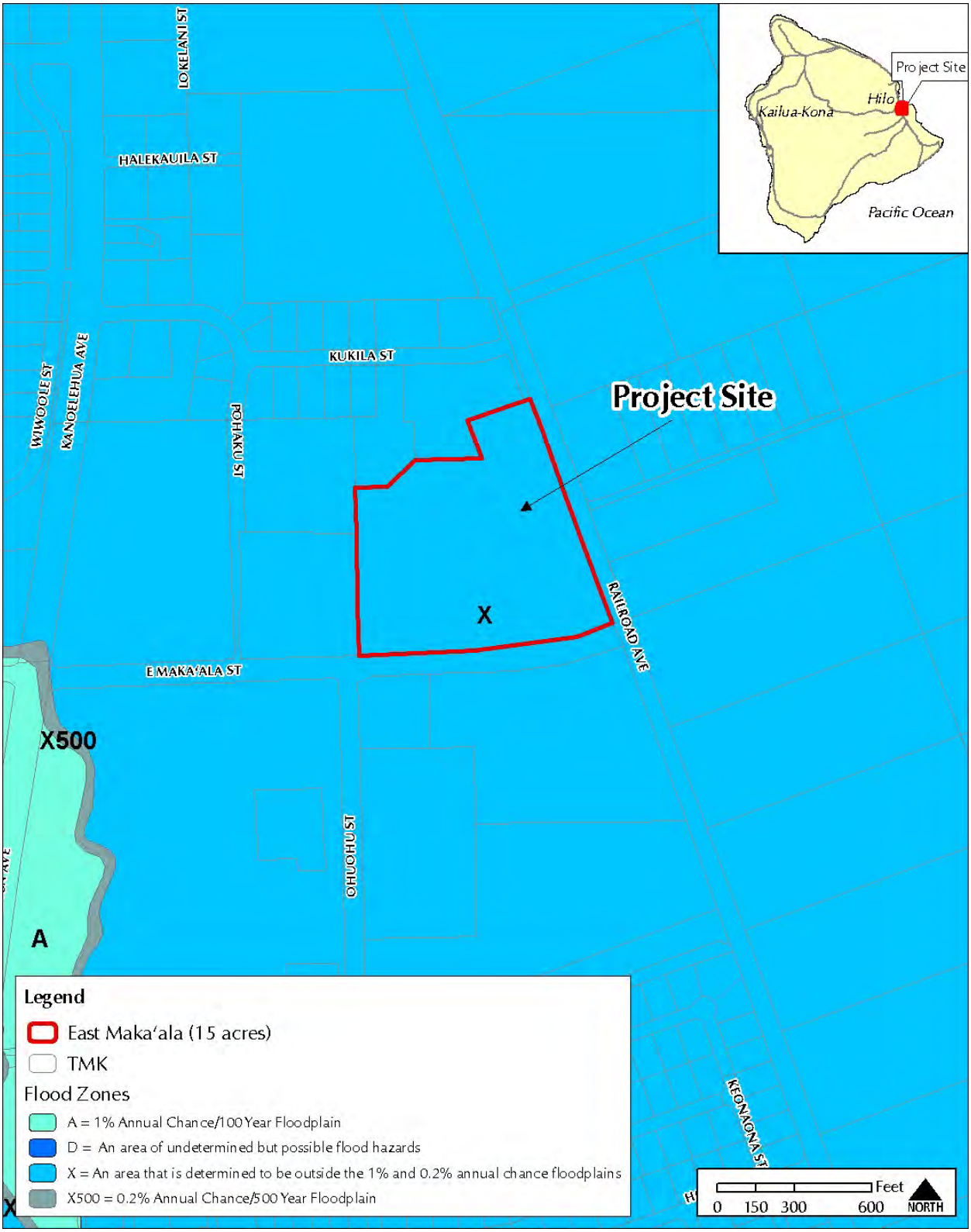

Figure 1.6 Flood Insurance Rate Map

Figure 1.7 Conceptual Site Plan

2.0 PROJECT DESCRIPTION

2.0 PROJECT DESCRIPTION

The Department of Hawaiian Home Lands has entered into negotiations for a joint lease agreement with Target Corporation and Safeway Inc. for the construction, operation, and management of an industrial/commercial mixed-use development and related facilities on 15.5 acres of Hawaiian Home Lands at the corner of East Maka'ala Street and Railroad Avenue, in South Hilo, Hawai'i.

The goals and objectives for DHHL is to generate general lease revenue to serve native Hawaiian beneficiaries as cited in the Hawaiian Homes Commission Act, 1920, as amended, and to facilitate commercial growth and provide growth and employment opportunities for native Hawaiian beneficiaries. DHHL defines "native Hawaiians" (differentiated from "Native Hawaiians") as individuals having at least 50 percent Hawaiian blood.

DHHL wishes to lease the subject parcel for development at its highest and best use, which has been designated as an industrial/ commercial mixed use zone under the County of Hawai'i's MCX Industrial-Commercial Mixed District zoning requirements. DHHL does not feel that residential uses on this site are compatible with its objectives. Trust lands not in homestead use can be leased at market value to generate income to supplement DHHL's programs including homestead development.

Public auction for these approximate 15.574 acres (678,403 square feet) of Hawaiian Home Lands was offered for a general lease disposition with a minimum term of twenty-five (25) years. The call for bidding began on June 13, 2008. The site was designated for Industrial/Commercial Mixed Use in the bid information. Applicants that met DHHL's qualifications had until September 26, 2008, to turn in their sealed rent bids and a deposit. The bids were opened on October 17, 2008, with the winning bid submitted by Target Corporation and Safeway Inc. as joint developers.

The proposed project will create over 220,000 square feet of mixed industrial commercial use consisting of a general merchandise store (Target) and a grocery supermarket with pharmacy (Safeway). While details of the development plan are still being developed, this Final ~~Draft~~ EA is based on expected development impacts for similar types of improvements.

The lease period is fixed for the first 25 years and will be renegotiated for the remainder of the term. The property will be leased for $568,460 per year for the first decade and then rises every five years to $727,686, $823,304 and $931,486 from the 21st and 25th year. The project as proposed is expected to generate $18.1 million over the next 25 years. Rent after the 25th year will be determined on a decadal basis if the lease is to be extended to 65 years. The final terms of the lease will be negotiated by early 2009.

2.1 PROPERTY DESCRIPTION

The property is presently zoned MG-1a, General Industrial District by the County of Hawai'i (County). It is generally square-shaped, with an irregularly shaped northern boundary and extensive roadway frontage and exposure along both Maka'ala Street and Railroad Avenue.

The site has roadway frontage and exposure along Maka'ala Street and Railroad Avenue. The site is generally level at surrounding street elevations and appears to have been cleared and graded in the past. Much of the property is paved with asphalt and/ or gravel. Vegetation consists mostly of weedy grasses and vines with a few major trees.

The site is presently improved with a number of older, industrial structures including 4 sheds remaining from timber mill operations from the period of 1966 through the early 1980s, 3 of which are in use by current tenants for truck and 55-gallon drum storage. No buildings on site are more than 50 years old, and therefore none are eligible for consideration for state historic designation.

The property was undeveloped until 1966 when Canadian Pacific Corporation- Hawaiian Timber Company purchased a 40-year lease from DHHL to create a saw mill for koa production which included the construction of 6 structures on-site. In 1985 the current tenant Akana Petroleum, Inc. was assigned a lease for a 14-pump retail gas station with five 10,000 gallon underground storage tanks (USTs). Eleven aboveground storage tanks (ASTs) from 2,000 - 12,000 gallons were installed in 1990 for hydraulic fluid, lubricating oil, and diesel stored for bulk delivery in 55 gallon drums. Akana Petroleum remains a current tenant on TMK (3) 2-2-47:72.

There are a number of tenants that have or are currently using the subject site for industrial uses such as vehicle and bulk product storage including RAK Repair, Genra-Li Services, Hawaiian Forklift, Kalae's Services, Golden State Foods, Loomis, Pacific Transportation Service, and American Standard Concrete Pumping.

Roughly in the center of the lot under one of the older industrial structural remnants there is a refuse area containing small piles of scrap metal, wood pallets, timber, rubber hosing, car parts, tires, 55-gallon drums, and disconnected gas pumps. Nearby there is an automotive storage area of approximately 16-20 trucks, cars, forklift/ mowers, trailers, and 1 bus.

The site was recently utilized as a temporary base yard during the construction period of the nearby Home Depot Store. See *Figure 2.1* for photographs of the existing site.

2.2 SURROUNDING USE

The property's immediate neighborhood is the Waiākea area of Hilo. A significant amount of land in this part of Hilo is owned and managed by DHHL. The development of Prince Kuhio Plaza (managed by General Growth Properties) on nearby DHHL property shifted the historical commercial retail focus of Hilo to this area. The site is adjacent to the Prince Kuhio Plaza's employees' parking lot along Ohuohu Street and within walking distance of both Prince Kuhio Plaza and Waiākea Center. Home Depot is located south of the subject site across Maka'ala Street, and west of Home Depot is a Panda Express. Other major retail developments concentrated in the area include Waiākea Center (anchored by Wal-Mart and situated on DHHL property), KTA's Pū'ainakō Center, Pū'ainakō Town Center, and Ginger Patch Commercial Center.

View from site north to Wal-Mart

Figure 2.1 Site Photos

Home Depot across E Maka'ala Street

Panda Express across E Maka'ala Street

Undeveloped area across Railroad Avenue

Figure 2.1 Site Photos (continued)

Railroad and E Maka'ala Street Intersection Sign

Railroad and E Maka'ala

E Maka'ala Street. View from project site.

Hydrant along E Maka'ala Street. View from project site across to Home Depot

Figure 2.1 Site Photos (continued)

2.3 PROPOSED USE

The proposed project may be generally characterized as a large commercial/industrial development with 220,000 sf of mixed industrial commercial use consisting of a 160,000 sf discount general merchandise store (Target) and a 60,000 sf supermarket (Safeway) with additional space for a loading dock and an area for stock. Development plans are still underway. However, for the purposes of this Final ~~Draft~~ Environmental Assessment, a conceptual plan is provided for analysis.

Driveway access points to the parking area are proposed both from Railroad Avenue and East Maka'ala with an additional service lane and entrance from Railroad Avenue. Given the level of development proposed, approximately 712 on-site parking stalls for personal use vehicles would be provided. If the development moves forward, landscaping of the property will be according to county codes with considerations of native plant use and stormwater retention included in the landscape planning.

DHHL plans to designate the site under the Industrial-Commercial Mixed District (MCX) guidelines for planning and permitting purposes. This type of development is envisioned as compatible with surrounding land use and economic development goals for the area.

Sitework and construction of improvement is estimated to take approximately 14 months from receipt of all necessary entitlements and building permits. Development cost is estimated at approximately $60 million.

2.4 SUSTAINABLE BUILDING DESIGN

The Office of Environmental Quality Control (OEQC) has issued "Guidelines for Sustainable Building Design in Hawai'i: A Planner's Checklist" (OEQC May 1999) and has requested that consideration be made in applying sustainable building techniques to projects. The OEQC Guidelines state, "[a] sustainable building is built to minimize energy use, expense, waste and impact on the environment."

Recommendations to meet this goal include:

- Maximize the open space/non-developed space on the property.
- Develop the site with pervious surfaces and implement stormwater management controls.
- Specifying and installing Green Roofs on the developed structures will create additional natural vegetated areas and help retain stormwater onsite.
- Request/specify native plant species to be used in the landscape design as well as water efficient landscaping practices.
- Design for rainwater harvesting for irrigation purposes to decrease the consumption of potable water for landscaping purposes.
- Throughout the property specify high solar reflectance materials for all hardscapes or open grid paving systems and plant large shade trees to provide shading to reduce the "heat island effect" on streets, sidewalks and parking areas.

- Within the built structure install water efficient fixtures and energy efficient lighting fixtures and controls to reduce electricity consumption.
- Integrate materials that contain recycled content, materials sourced regionally, Forest Stewardship Council (FSC) certified wood, low Volatile Organic Compounds (VOC) products, and wood products with no added urea formaldehyde.
- Integrate renewable energy production on site for 12.5% of the electrical demand through photovoltaic systems and wind.

To assist Target Corp. and Safeway Inc. in sustainable green building design, the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System is suggested as a guide. Using the best LEED rating system applicable may serve as an incentive for a greater sustainable design and construction of the proposed mixed use development. This sustainable green building design approach has the potential to optimize efficiencies on the subject property, reduce capital costs, and reduce operations and maintenance costs long term while maximizing quality of life and minimizing environmental impacts.

The UGSBC LEED Certification program adds value to each project by:

1. Validation that sustainable practices are, in fact, met.
2. Quantifies achievements with realistic goals.
3. When applied properly, saves project money on:
    a. Infrastructure costs
    b. HVAC and Mechanical costs
    c. Operations
    d. Maintenance
    e. Tenant and employee sick day reduction
4. Provides regional, national, and international recognition through certification award.

2.5 APPROVALS AND PERMITS

During the implementation stages of the project, the applicant will work with relevant County review agencies for examination and approval of project plans and specifications.

Table 2-1 Required Permits and Approvals

Permit/ Approval	Responsible Agency
Chapter 343, HRS compliance	Department of Hawaiian Home Lands DOH Office of Environment Quality Control
Grading/Building Permits	County Building Department
Driveway connection to County road	County Department of Public Works
Water	County Board of Water Supply
National Pollutant Discharge Elimination System (NPDES)	State of Hawai'i DOH Environmental Management Division

3.0 AFFECTED ENVIRONMENT AND POTENTIAL IMPACTS AND MITIGATION MEASURES

3.0 AFFECTED ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

The environment surrounding the proposed project site includes the physical or natural environment and the human or social environment. This section describes the existing conditions, potential impacts to the environment, and proposed mitigative measures.

3.1 NATURAL ENVIRONMENT

3.1.1 Climate

The climate of the Pana'ewa region is generally warm and humid with average daily temperatures ranging from 68 to 80 degrees Fahrenheit in the winter months and 72 to 87 degrees Fahrenheit in the summer months. Hilo is known for its rains, and average rainfall ranges from 125 to 150 inches per year, with the winter months receiving the majority of the rainfall.

Winds are dominated by trades from the northeast with southwestern winds associated with "Kona" storms occurring predominately in the winter months. In the absence of the trades or storm conditions, winds occasionally become light and variable and, at times, the diurnal heating and cooling of the island gives rise to onshore sea breezes during the day and offshore land breezes at night. Strong winds occur at times in connection with storm systems moving through the area.

Potential Impact and Mitigation Measures

The project is not expected to have an effect on climatic conditions. As such, no mitigative measures are proposed.

3.1.2 Air Quality

Regional and local climate and various anthropogenic sources tend to affect air quality at any given location. Hawai'i's remote location in the Central Pacific distant from major sources of pollution means that air problems generally result from local sources. Kīlauea Volcano is approximately 30 miles southwest of the proposed project site and has been releasing volcanic gases through its Pu'u Ō'ō vent intermittently since 1983. The gaseous emissions combine with local atmospheric conditions to produce volcanic fog, or "vog." Vog conditions and impacts to ambient air quality are monitored at Hilo Airport.

Despite the vog, air quality for Hawai'i Island is in the "good" category of the Air Quality Index, or between 0-50 particles. Air pollution is limited in the Hilo region and is typically diffused by trade winds.

Potential Impacts and Mitigative Measures

Construction will not significantly impact air quality. Development activities will comply with the provisions of Hawai'i Administrative Rules (HAR) Section 11-60.1-33 on Fugitive Dust. Vehicular emissions will increase from construction equipment during the temporary construction period. State and Federal Air Quality Standards are not expected to be exceeded

during construction, and no significant adverse impacts are anticipated. Mitigation measures to minimize air quality impacts during construction include dust control measures such as frequent watering and rapid establishment of gravel and plant materials once grading is completed.

During operation of the Target and Safeway stores, increased vehicular traffic to the site may contribute to air quality degradation but is not expected to violate State or Federal air quality standards.

3.1.3 Topography/Geology

The project site is approximately 30 miles northeast of Mauna Loa in the flatlands of Hilo in an area of volcanic activity associated with Pele. The terrain within the site is composed of ʻaʻā lava flows formed by Mauna Loa during the Holocene Epoch, dating back approximately 1,470 years. The geology of the site is classified as Kaʻū Basalt, which consists of lava flows, vent deposits, littoral deposits, and tephra-fall, or deposits of tholeiitic basalt. The project site is almost level, with an elevation of 83 feet above mean sea level *(Figure 3.1).*

Potential Impacts and Mitigative Measures

Preparation of the site will require some grading and leveling of the topography though minimal grading is anticipated since the site has been previously graded. All grading operations will be conducted in compliance with dust and erosion controls and other requirements of the County of Hawaiʻi Erosion and Sedimentation Control Ordinance (Chapter 10, HCC), which covers grading and the provisions of Chapter 11-60.1, Hawaiʻi Administrative Rules, Section 11-60.1-33 on fugitive dust. Significant impacts to the area topography are not expected

Mitigative measures include the application of best management practices (BMPs), adherence to County regulations and standards, and implementation of standard control measures.

3.1.4 Soils

Three comprehensive soil suitability studies have been prepared and approved by government agencies for use in Hawaiʻi. These are the U.S. Department of Agriculture (USDA) *Soil Conservation Service Soil Survey (SCS)*, the University of Hawaiʻi Land Study Bureau (LSB) *Detailed Land Classification*, and the State of Hawaiʻi Department of Agriculture's *Agricultural Lands of Importance to the State of Hawaiʻi (ALISH)*. A Land Evaluation Site Assessment (LESA) was prepared in the 1980s for the State of Hawaiʻi, but it was never formally adopted by the State and thus is not cited here. The principal focus of these studies has been to describe the physical attributes of Hawaiʻi's lands and the relative productivity of different land types for agricultural production purposes.

According to the United States Department of Agriculture *Soil Conservation Service, Soil Survey of the Island of Hawaiʻi, State of Hawaiʻi, 1972*, the soils on the site area classified as Pāpaʻi Extremely Stony Muck (rPAE) *(Figure 3.2).* A brief description of this soil consists of well-drained, thin, extremely stony organic soils over fragmented ʻaʻā lava. This soil is found on uplands at an elevation ranging from near sea level to 1,000 feet and receives from 90 inches to more than 150 inches of rainfall annually. In a representative profile, the surface layer is very dark brown

extremely stony muck about 8 inches thick. Permeability is rapid, runoff is slow, and threat of erosion hazard is slight. At the project site, the Pāpa'i extremely stony muck (rPAE) is approximately 8 inches thick, and is underlain by fragmental 'a'ā lava. These soils have formed over Mauna Loa lava flows that are approximately 750-1,500 years old.

The University of Hawai'i Land Study Bureau classifies the soils of the site as "Urban Land." This classification means the soils of the site have not been rated for agricultural use because they are considered urban areas.

The State of Hawai'i Department of Agriculture Agricultural Lands of Importance to the State of Hawai'i (ALISH) system of defining agricultural suitability has classified soils on the site as "other agricultural lands of importance to the State of Hawai'i" *(Figure 3.3).* "Other Important Agricultural Land" is land other than that classified as prime or unique agricultural land that is of statewide or local importance for agricultural use.

Potential Impacts and Mitigative Measures

The site is within the County's General Industrial zoning district. Farming is not a permitted use in the General Industrial zoning district though the processing of agricultural products is allowed. While most of the area in the vicinity is zoned for industrial uses, there are other nearby DHHL lands available for agricultural uses.

Given the agricultural limitations of the soils of the site and the extent of other more suitable agricultural lands in the region~~s~~, the curtailment of potential agricultural use on the site is not considered a significant impact.

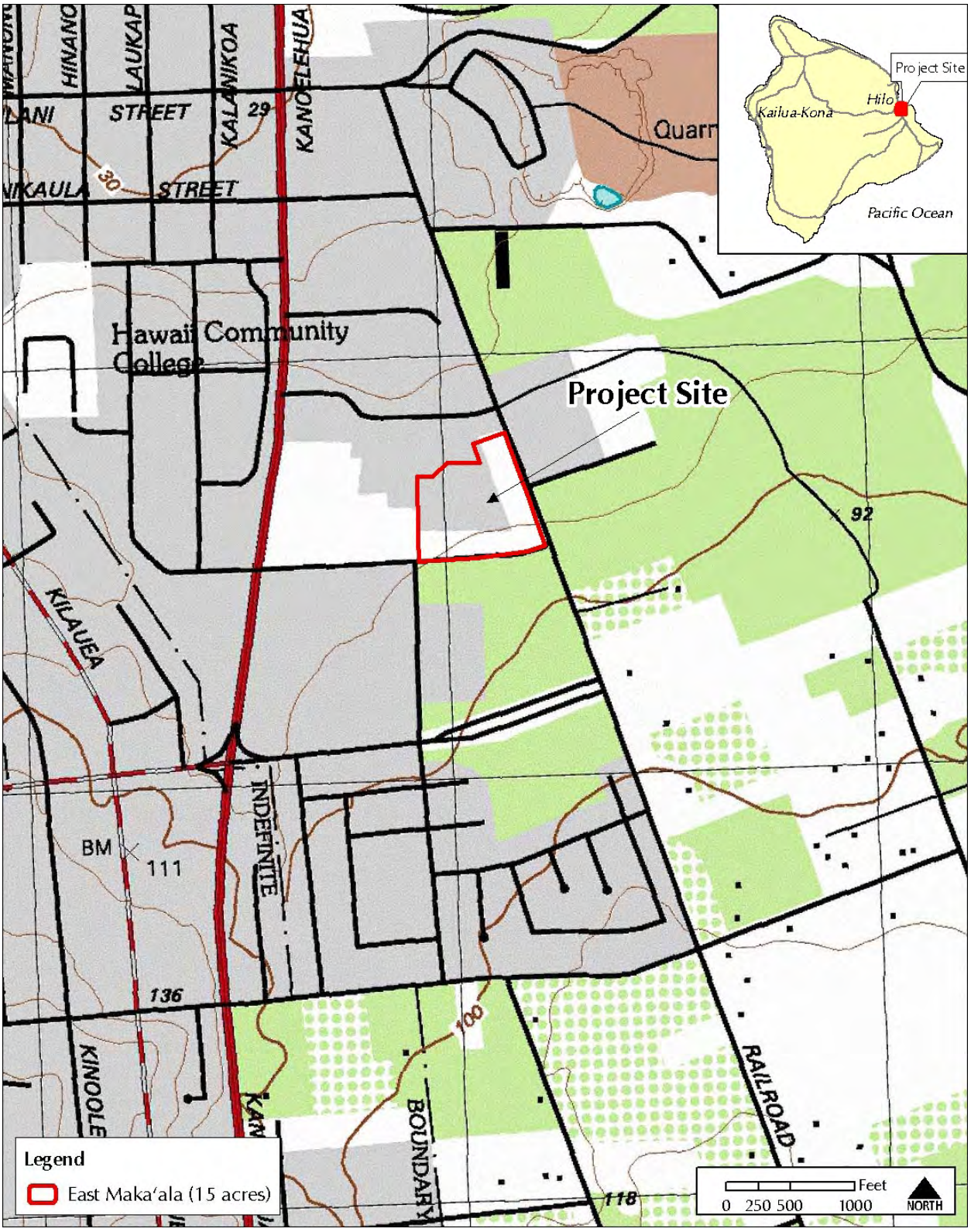

Figure 3.1 Topography Map

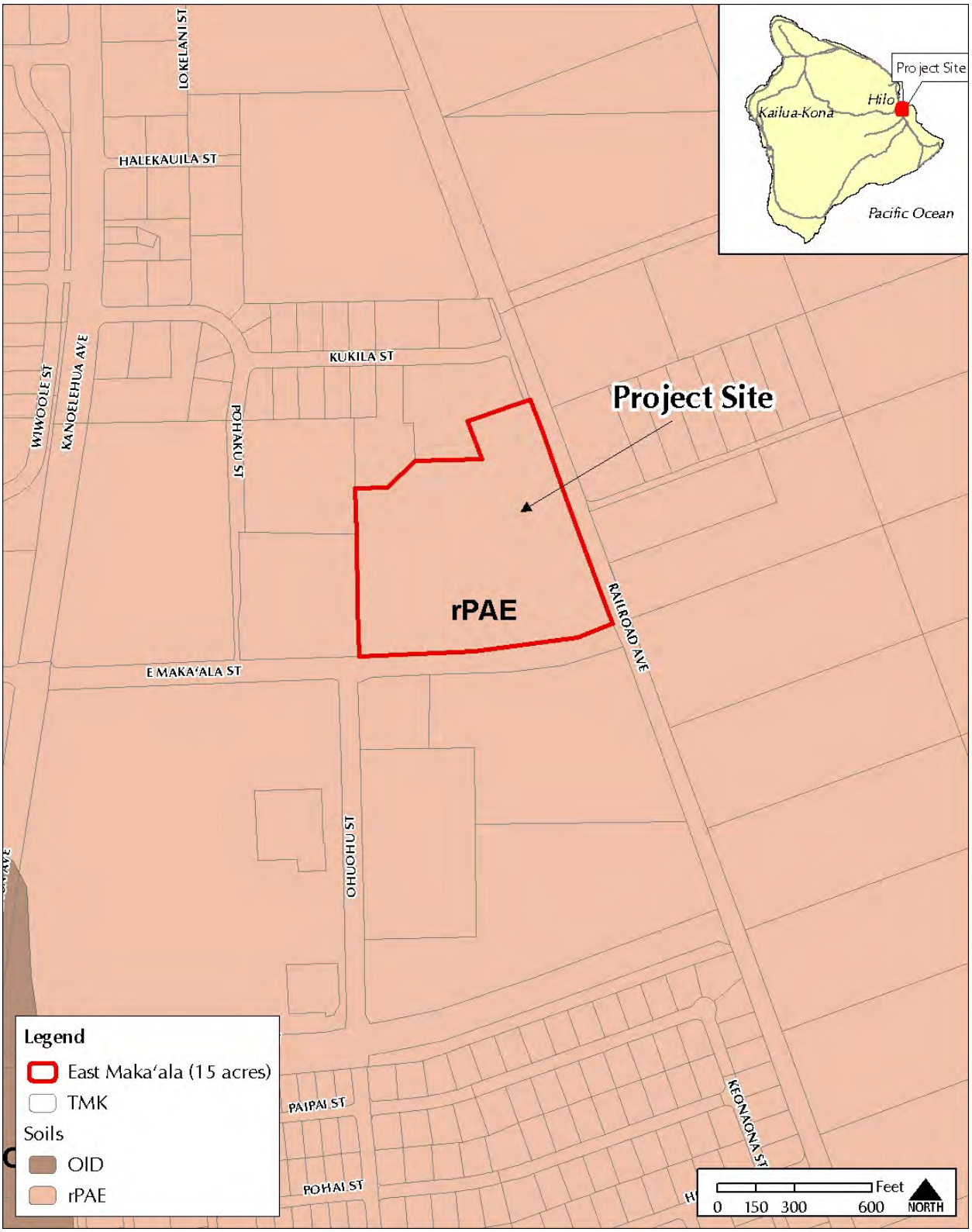

Figure 3.2 Soils Map

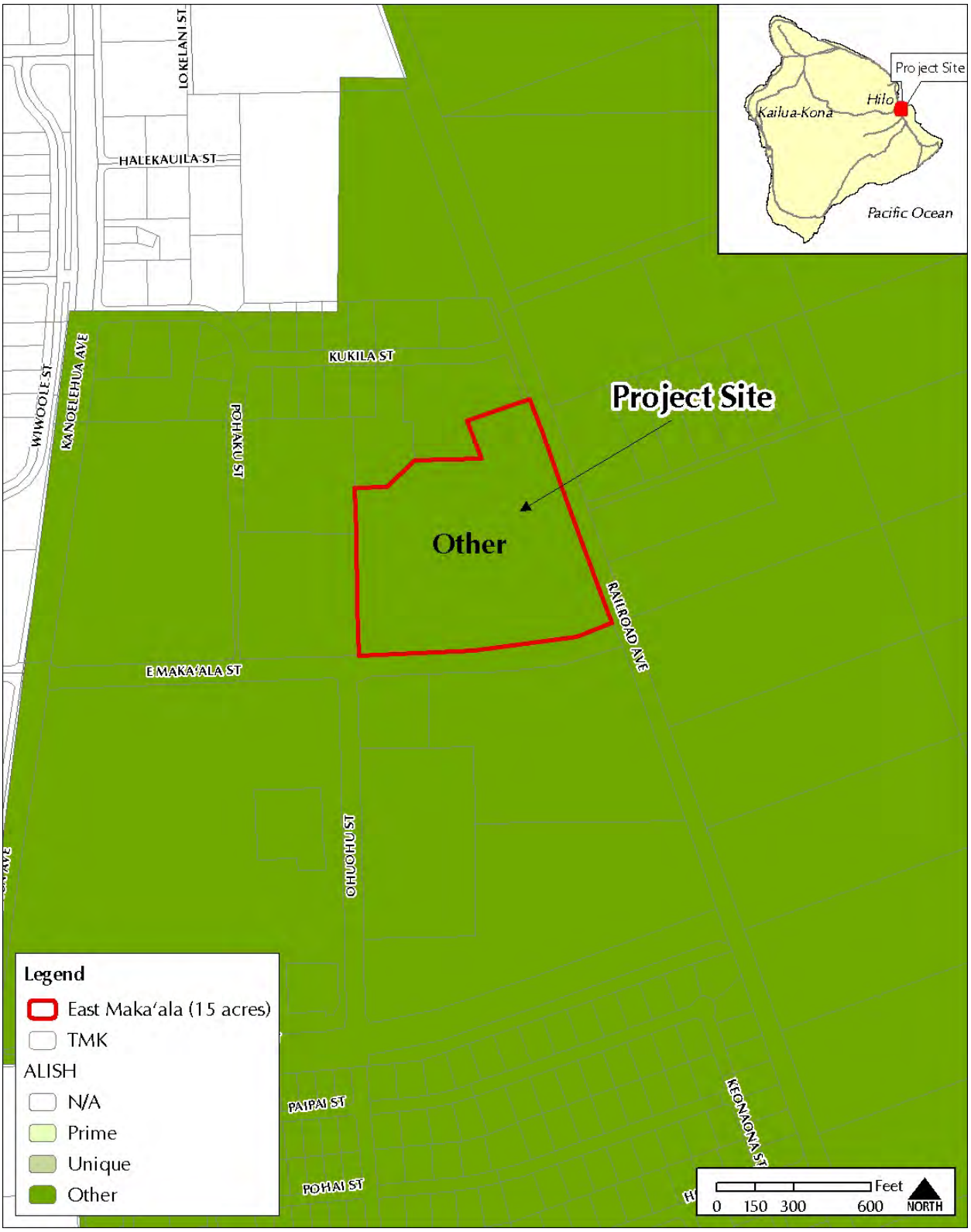

Figure 3.3 Agricultural Lands of Importance to the State of Hawai'i (ALISH)

3.1.5 Surface and Groundwater

Surface Water: There are no major surface water bodies on or running through the property, and none are located adjacent to the site. Stormwater runoff from the site both soaks into the ground and runs off site in a moderate flow of approximately 25 cfs. Stormwater from the streets flows along the adjacent streets that have stormwater grates. With appropriate measures, stormwater from the proposed development will be retained onsite as addressed in *Section 3.3.3*.

Groundwater: The site is located in the Northeast aquifer sector and is part of the Hilo Aquifer System. The aquifer is basal (fresh water in contact with seawater), unconfined, and occurs as a flank aquifer (horizontally extensive lavas). The groundwater is identified as a currently used fresh drinking water source. The aquifer has a high vulnerability to contamination and is considered irreplaceable. However, the subject site is located below the State Department of Health's (DOH) underground injection control (UIC) line, meaning the underlying aquifer would not be considered a drinking water source.

The UIC line is intended to protect drinking water from potential contamination from injection well activity. Aquifers above the UIC in elevation are protected, and there are maps for each island of Hawai'i defining the UIC line. Though the groundwater below the site is identified as a currently used fresh drinking water source, the aquifer is not protected as a drinking water source by the State because of its elevation and location.

Potential Impacts and Mitigative Measures

A potential positive impact of the proposed development is that potential pollution of groundwater resulting from current use would be eliminated.

3.1.6 Flora

Pana'ewa is known for its abundance of culturally significant 'ōhi'a lehua *(Metrosideros polymorpha)* groves. The 'ōhi'a are the first hardwood trees known to recolonize new lava flows. These trees help soften the lava, creating a growing medium for other plants to grow around them. However, at this specific site, there are very few 'ōhi'a present, and those observed were clearly planted as landscape ornamentals.

No botanical survey has been recently conducted within the project site. The project site has been cleared in historic times and, in places, built over in conjunction with the existing industrial uses. Recent botanical surveys conducted for areas close to the project site and reviewed for this report have not reported any candidate, proposed, or listed threatened or endangered species in the vicinity of the project site.

The entire project area appears to have been substantially graded in the past and does not contain virgin vegetation. If still present, the natural vegetation within the study area would consist~~s~~ of 'ōhi'a, tree fern, uluhe fern, and guava. Much of the property is covered in gravel and asphalt peppered with intermittent grass growth. Though there is the possibility for pollution resulting from current operations at the site, vegetation does not appear to be distressed.

Currently, the project site includes a limited vegetation cover of exotic weeds and grasses *(Figure 3.4).* The vegetation of the site includes one observed and clearly planted 'ōhi'a tree *(Metrosideros polymorpha),* which is a native plant. Major trees include Polynesian introduction or "canoe plants" such as coconut and other palms, Norfolk pines, Macaranga, and gunpowder trees. Other Polynesian introduced plants observed are hau *(Hibiscus macrophyllus),* ornamental ti, and pandanus *(Pandanus odoratissimus).* The majority of the vegetation is comprised of alien (i.e. introduced to Hawai'i by humans) species including: common guava *(Psidium guajava)*, koa haole *(Leucaena leucocephalala)*, ferns, and numerous weedy and grass species, such as California and Guinea grasses. There are some decorative landscaping plants including ti, hibiscus, and Lobelia family species around the Akana Petroleum offices. Some wetland sedges were observed in low-lying areas at the mid-northern boundary of the property.

Potential Impacts and Mitigative Measures

There will be no impact to endangered or threatened vegetative species resulting from the proposed development. The few 'ōhi'a trees are recommended for retention/replanting. ~~may be able to be moved and saved.~~ The developer will landscape the parking lot and street frontages in accordance with the Hawai'i County Code. This includes installing topsoil, grassing, and planting the required trees and shrubbery. The islands within the main parking lot will be grassed and planted as well. Utilization of native vegetation in the landscape plan is recommended.

Figure 3.4 View to the North of the Undeveloped Eastern Portion of the Study Area

3.1.7 Fauna

No faunal surveys have been recently conducted within the project site. The project site has been cleared in historic times and, in places, built over in conjunction with existing industrial land uses. Recent faunal surveys conducted for areas close to the subject property and reviewed for this report have not reported any candidate, proposed or listed threatened or endangered species in the vicinity of the project site. During a site visit, no endangered fauna were observed at the project site.

There is an area around the former timber company structure near the southeast corner of the property cordoned off with a sign warning of pesticide treatment for "stinging bees" accompanied by a sharp chemical smell. The presence of chemical spill stains and puddles with oily films indicates that the habitat on the project site has been impacted by current and past use.

Typical alien feral animals such as cats, mongooses, rats, and mice are anticipated though not observed during the field visits. Though the subject site is not ideal for avian species, it is likely that the birds that do use the site are mostly alien species such as doves and sparrows. The endemic Hawaiian Petrel, or 'ua'u (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater, or 'a'o (*Puffinus auricularis newelli*) may fly over the project area. It is possible that the Hawaiian Hawk (*Buteo solitarius*), or *'io*, listed as an endangered species under both the U.S. Fish and Wildlife Service and the State of Hawai'i's endangered species programs, and the pueo, or Hawaiian Owl (*Asio flammeus sandwicensis*), are sometimes present on the property and may forage in the adjacent forested acreage. The same may be true of fruit bats. Bats are regularly observed in and around Hilo as well as along the coastline from Puna to North Hilo.

Potential Impacts and Mitigative Measures

There will not be any significant loss of habitat because of this project. Though this project calls for an increased amount of pervious surface and developed area, there is the potential that the development could improve habitat by eliminating potential ground pollution from abandoned vehicles, refuse, and chemicals from current activity at the site and by creating habitat through sustainable stormwater retention strategies.

It is unlikely that the proposed development will have significant negative impacts on the endangered Hawaiian Hawk or the endemic Hawaiian Owl because the existing habitat is not ideal for these~~is~~ species. There are few trees for perching, and though the grassland habitat might offer cover for rodents and other prey items usually consumed by this species, the ground has been impacted by asphalt and gravel paving.

To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, all lighting will comply with the lighting requirements of the Hawai'i County Code, including shielding of external lights. This mitigation measure will serve the multiple purposes of minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters, lowering ambient glare to the astronomical observatories located on Mauna Kea, and minimizing contribution to light pollution.

It is likely that the endangered Hawaiian hoary bat uses resources within the general area, though not on the subject site, as they tend to congregate around trees and groves. Unlike nocturnally flying seabirds which often collide with man-made structures, bats are uniquely adapted to avoid collision with obstacles since they navigate using ultrasonic echolocation.

3.1.8 Natural Hazards

The Island of Hawai'i has a Zone 3 Seismic Probability Rating. Zone 3 areas are at risk from major earthquake damage, especially to structures that are poorly designed or built.

The USGS has identified lava flow hazard zones for the Island of Hawai'i. The current map divides the Island into zones that are ranked on a scale of ascending risk from 1 to 9 based on the probability of coverage by lava flows. These zones are based chiefly on the location and frequency of both historic and prehistoric eruptions and take into account the larger topographical features of the volcanoes that will affect the distribution of lava flows. Along with most of the Hilo area, the area in which the project site is located is designated as Lava Flow Hazard Zone 3 *(Figure 3.5)*. Zone 3 is considered less hazardous than Zone 2 (which is adjacent to and down slope of active risk zones), because of greater distance from recently active vents and/or because the topography makes it less likely that flows will cover these areas. The site is situated on a lava flow that occurred between 750 and 1,500 years ago. The nearest historic flow approached Hilo in 1880, terminating in the area of what is now the University of Hawai'i at Hilo Research and Technology Park, approximately four miles from the project site.

The gaseous emissions from Kīlauea Volcano combine with local atmospheric conditions to produce volcanic fog, or "vog" which has the potential to diminish long range visibility depending on the direction of the prevailing winds and to impact air quality. In spite of the vog, air quality for Hawai'i Island remains in the "good" category of the Air Quality Index, or between 0-50 particles.

While it is difficult to predict natural occurrences such as tsunamis and hurricanes, it is reasonable to assume that future events could be likely. The proposed project site is outside of the Tsunami Evacuation Zones produced by the Joint Institute for Marine and Atmospheric Research at the University of Hawai'i in cooperation with the State of Hawai'i Civil Defense System. Brushfires are not a likely hazard in the damp Hilo region, though they have occurred.

The Flood Insurance Rate Map (FIRM) indicates that the project site is in Zone X, areas determined to be outside the 500 year flood plain. The National Flood Insurance Program does not have any regulatory requirements for developments within Zone X *(Figure 1.6)*.

Potential Impacts and Mitigative Measures

The project will not exacerbate any hazardous conditions. All structures will be constructed for protection from earthquakes, destructive winds, and torrential rainfall of tropical hurricanes in accordance with the Building Code adopted by the County of Hawai'i. Though the risk of brush fires and arson is low, methods to prevent and fight fire such as interior sprinkler systems and fire apparatus access are being considered for optimal inclusion in the site design. In the event of a chemical spill of any kind, the tenants will contact the proper authorities for containment and cleanup.

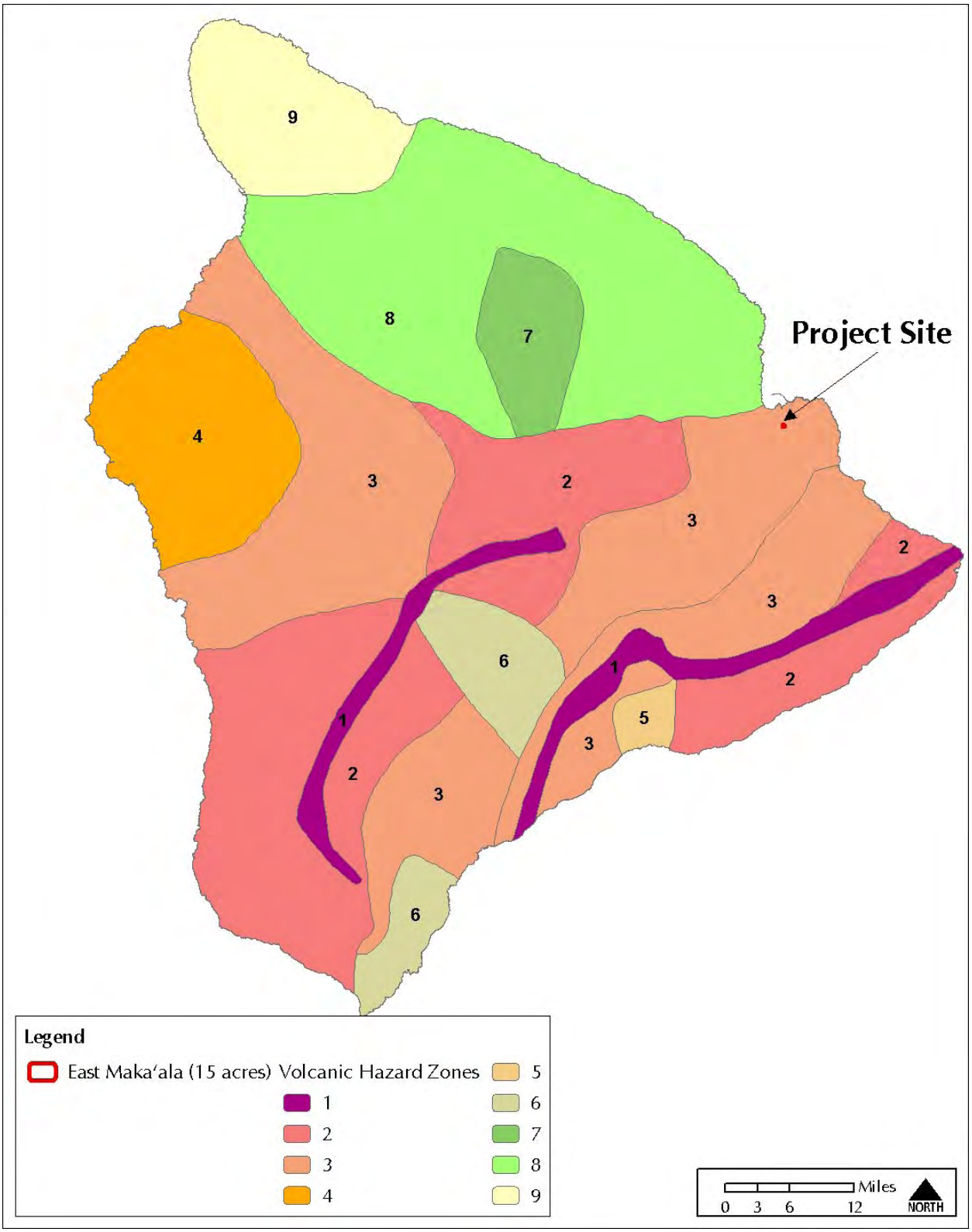

Figure 3.5 Lava Hazard Map

3.2 SOCIAL AND CULTURAL ENVIRONMENT

3.2.1 Archaeological and Historic Resources

An archaeological and cultural report is provided in Appendix B. The current project area in Pana'ewa Tract 1, Waiākea, in South Hilo remained undeveloped until March 6, 1966 when Canadian Pacific Corporation, formerly Hawaiian Timber Company, obtained a 40-year lease from DHHL to operate a saw mill specializing in koa. Six structures were constructed in support of the saw mill. The three-section main structure consisted of a 1,152 square feet, dirt floor, open side canopy. There were also two 1,200 square feet, slanted roof, open side, dirt floor saw mill sheds. Two 3,977-square feet and one 12,000 square feet open side warehouses comprised the final three structures. These are some of the structures that can be seen on the property today. The saw mill continued its operation until the early 1980s.

Early archaeological study of East Hawai'i was conducted by Hudson (1932) for the B. P. Bishop Museum. He noted that, "there was an important village and trading center around Hilo Bay" (1932:20), but related that, "no archaeological remains are to be found within the town of Hilo itself except a few stones which are said to have been taken from heiaus…" (1932:226). Hudson relates that one heiau was formerly present in Waiākea Ahupua'a near the route of the present Kilauea Avenue.~~, he writes:~~

More recent archaeological studies in Waiākea Ahupua'a (Borthwick et al. 1993; Carson 1999, Devereux et al. 1997; Escott 2004; Hunt and McDermott 1993; Maly et al.1994; Rechtman and Henry 1998; M. Rosendahl 1988a; M. Rosendahl 1988b; M. Rosendahl and Talea 1988; and Spear 1995) have produced negative results or have identified, almost exclusively, historic archaeological remains associated with either U.S. Military activity or the Waiākea Sugar Plantation, which operated in Waiākea Ahupua'a between 1879 and 1947 (Rechtman and Henry 1998). One additional study (Wolforth 2004) addressed possible ancient fishpond sites along the Waiākea shoreline.

Given the cultural-historical background detailed in *3.2.2 Cultural Impacts*, the results of previous archaeological studies in the vicinity of the project area, the existing conditions of the property, the extensive ground disturbance, and the generally solid rock nature of the substrate, the archaeological expectations for the current study parcel are extremely limited. It is likely that if any archaeological features were ever present they have been significantly disturbed if not completely destroyed by modern land use activities.

On September 15, 2008, Robert B. Rechtman, Ph.D. and Ashton K. Dircks, B.A. performed a field inspection of the project area, the limits of which were clearly identifiable in the field. The entire surface area of the property, which appears to have been 100% graded in the past, was visually inspected. No archaeological resources were observed within the project area, and the likelihood of encountering subsurface resources is extremely remote.

Potential Impacts and Mitigative Measures

Several existing older~~,~~ industrial structures would need to be demolished to make the development proposal possible. Since the earliest development on the subject property dates to 1966, no structures on the property are older than 50 years which would warrant

documentation by the Architecture Branch of the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources.

Based on the conclusions of the archaeological survey, no impacts to archaeological resources are anticipated. However, in the event that any historic resources or archaeologically significant artifacts including human remains, cultural materials, lava tubes, and lava blisters/bubbles or other indicators are uncovered during construction, work will cease in the area, and SHPD and other appropriate agencies will be contacted as pursuant to Hawai'i Revised Statutes (HRS) 6E and Hawai'i Administrative Rules (HAR) 13-275-12 and 13-300-40.

All construction plans will include the following language as normally recommended by the SHPD:

> Should historic ~~remains~~ resources ~~such as~~ including human skeletal remains, ~~artifacts~~ cultural materials, burials, lava tubes, lava blisters, and concentrations of shell or charcoal be encountered during the construction activities, work shall cease immediately in the immediate vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact SHPD and the district representative of the Hawai'i Island Burial Council to assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

Burials have their own unique rules under HRS 6E-43.6 and HAR 13-300. On outer islands such as Hawai'i, requirements detailed in HRS 6E-43.6 must be completed within three working days of inadvertent discovery of a multiple burial sites and two days for a single burial.

As per HRS 6E-8(b), DHHL must consult with the SHPD prior to any proposed project relating to lands under its jurisdiction regarding the effect of the project upon historic property or a burial site. Correspondence between SHPD and Group 70 International regarding the proposed project is included in *7.0 Consultation with Agencies, Organizations, and Individuals*. A letter was ~~has been~~ sent to SHPD requesting a determination of "no historic properties affected." SHPD's response determining that no historic properties will be affected by this project is described in *3.2.2 Cultural Impacts*.

3.2.2 Cultural Impacts

The proposed project area is in the ahupua'a of Waiākea in the South Hilo District. Waiākea covers over 95,000 acres and extends along the coast from the west side of Hilo Bay to the Puna boundary and inland to an approximate elevation of 6,000 feet.

Pualani Kanahele's account of the area as described in DHHL's *Draft Pana'ewa Regional Plan* notes that Pana'ewa is known as a special forest of 'ōhi'a lehua groves bordering Puna and Hilo. The forest was named for the mo'o, or lizard deity, Pana'ewa who lived in this forest. The forest is also considered the domain of Hi'iaka and Pele. It was in this forest that Hi'iaka defeated the supernatural woman, Pā 'ie'ie and her mo'o companions.

The earliest historical knowledge of Hilo comes from legends written by Kamakau (1961) of a 16th century chief 'Umi-a-Liloa (son of Liloa) who at that time ruled the entire island of Hawai'i. Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into ahupua'a that today retain their original names. These include the ahupua'a of

Pu'u'eo, Pi'ihonua, Punahoa, Pōnohawai, Kūkūau and Waiākea *(Figure 3.6*). However, only Pi'ihonua and Waiākea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea.

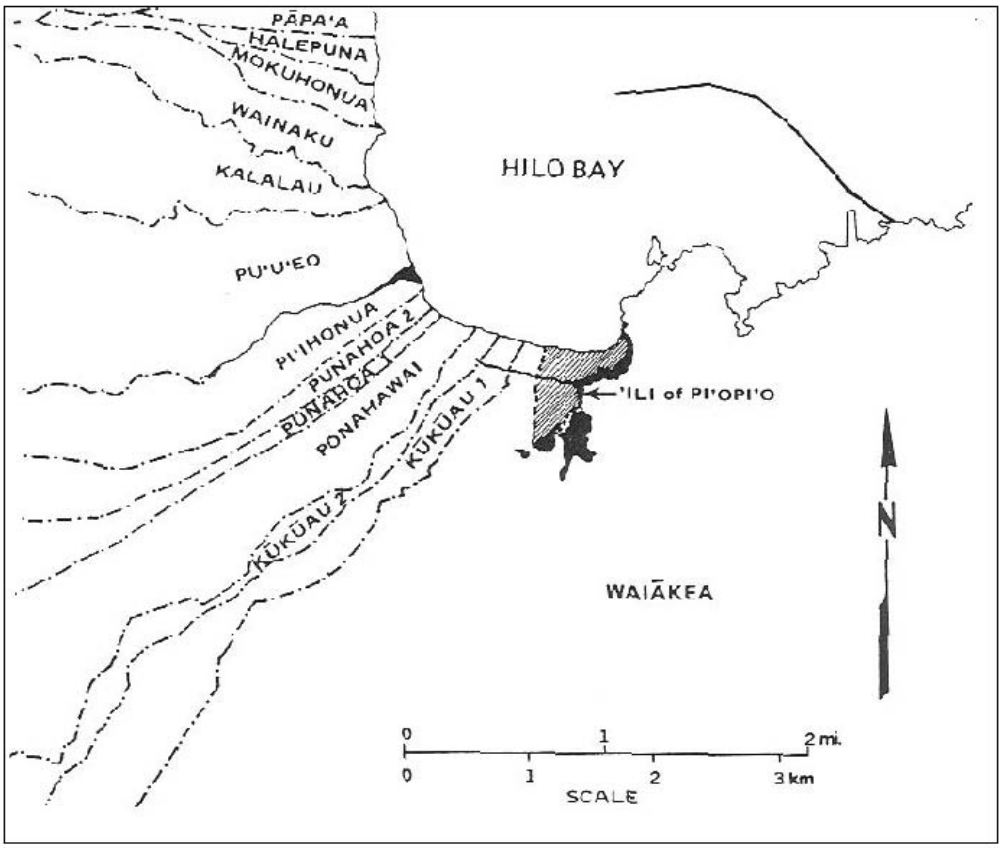

Figure 3.6 Hilo Bay Showing Ahupua'a (from Kelly et al. 1981)

Historical accounts (McEldowney 1979) indicate that much of Waiākea was in a zone of agricultural productivity. As Isabella Bird recorded upon arriving in Hilo in 1873:

> Above Hilo, broad lands sweeping up cloudwards, with their sugar cane, kalo, melons, pine-apples, and banana groves suggest the boundless liberality of Nature. (Bird 1964:38)

Handy and Handy (1972) also describe the general region as an agricultural area:

> On the lava strewn plain of Waiākea and on the slopes between Waiākea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in all the lower fern-forest zone above Hilo town along the course of the Wailuku River. (Handy and Handy 1972:539)

Maly (1996a) refers to a 1922 article from the Hawaiian Language newspaper, *Ka Nupepa Kū'oku'a*, where planting on pāhoehoe lava flats is described:

> There are pāhoehoe lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (mau ka'au) of them. The house sites are still there, not one or two

> but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors. (Maly 1996a:A-2)

Hilo was one of the larger population centers on the Island of Hawai'i, and also an area frequented by the ali'i (Moniz n.d.). Captain George Vancouver, an early European explorer who met with Kamehameha I at Waiākea in 1794, recorded that Kamehameha was there preparing for his invasion of the neighbor islands and that Hilo was an important center because his canoes were being built there (Moniz n.d.:7). The people of Hilo had long prepared for Kamehameha's arrival and collected a large number of hogs and a variety of plant foods to feed the ruler and his retinue. Kelly et al. (1981) surmise that the people of Hilo had actually prepared for a year prior to Kamehameha's visit and expanded their fields into the open lands behind Hilo to accommodate the increased number of people that would be present. Kelly et al. (1981) also speculate that many of the fish ponds in Waiākea were created to feed Kamehameha, his chiefs, and craftsmen. It was during this early Historic Period that Waiākea Ahupua'a became part of Kamehameha I's personal land holdings (Moniz n.d.:11).

William Ellis, one of the first missionaries to arrive in Hawai'i, spent five days in Waiākea in 1823 (Ellis 1963). He described it as a well-watered place, with some of the heaviest rains and densest fog he had encountered on the island. He considered the inhabitants lucky because of the well-stocked fishponds, fertile soil, and nearby woods as a source of lumber. Ellis (1963) estimated that nearly 400 houses were present near the bay, with a population of not less than 2,000 inhabitants. Ellis eventually set up a mission station in Waiākea that lasted until 1825 before moving to Punahoa 2nd Ahupua'a (Moniz n.d.).

As a result of the Māhele in 1848, nearly all of the ahupua'a of Waiākea became Crown Lands (for the occupant of the throne). According to Moniz (n.d.:12) twenty-six kuleana claims (LCAw.) were registered for lands in Waiākea; most of these lands were centered along fishponds or major inland roads, and none were in the immediate vicinity of the current study area. Most of the awards were for houselots and cultivated sections. One of the Land Commission Awards (LCAw. 7713) was for the 'ili of Pi'opi'o, which was traditionally the residence of chiefs, and which later served as the location of the original mission station in Waiākea (Moniz n.d.:9). This land was given by Kamehameha I to his wife Ka'ahumanu, and then awarded to Victoria Kamamalu during the Māhele. Kamehameha IV, Alexander Liholiho, as the occupant of the throne during the late Māhele period, received the rest of the Ahupua'a.

Following the Māhele, Kamehameha IV leased large portions of Waiākea to outside interests for pasture and sugarcane cultivation (Moniz n.d.). In 1861 S. Kipi leased the Crown Lands of Waiākea for the rate of $600 dollars a year to be used as pasture land for five years (Kelly et al. 1981; Maly 1996a). In 1874 the first lease for sugarcane cultivation in Waiākea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996a). This lease was eventually transferred to the Waiākea Mill Company, founded by Alexander Young and Theo H. Davis, and the Waiākea sugar plantation was established.

Established in 1879, the Waiākea Mill Company started with about 350 acres of cultivated lands acquired from Lyman. In 1888 the company acquired a 30-year lease that increased their land holdings in Waiākea Ahupua'a. When the lease ran out in 1918 the acreage under cultivation

had increased to nearly 7,000, but without a lease the ahupua'a fell under the homesteading laws, which required the government to lease the land to individual growers. Waiākea Mill Company was expected to grind the crop for the independent growers under a contract that gave the company 40% of the proceeds from the sale of the refined sugar. Contractual and legal problems combined with a declining sugar market and the devastating tsunami of 1946 led the Waiākea Mill Company to cease operation in 1947. During the 68 years of its operation, the Waiākea Mill Company was a major force in shaping the economic and social growth of Hilo and certainly left its mark on both the cultural and physical landscapes of the area.

The Department of Hawaiian Homelands came to be in stewardship of these and other Crown Lands based upon the Hawaiian Homes Commission Act, 1920, as amended (HHCA) (chapter 42, 42 Stat.108). The HHCA was passed by U.S. Congress and signed into law by President Warren Harding in 1921. At the time of this Act's passage, Hawai'i was a territory of the United States through a joint resolution passed by the U.S. government in 1898 following the 1893 overthrow of the Hawaiian monarchy. The HHCA affirms a special relationship between the U.S. and Native Hawaiians and reserves for native Hawaiian homesteading the 203,500 acres of the Hawaiian Kingdom Crown Lands and government lands deemed unusable for growing sugar, already homesteaded, or in forest conservation. When Hawai'i became a state in 1959, the United States ceded to the State of Hawai'i the 1.4 million acres of Hawaiian Kingdom Crown Lands and government lands, requiring that it be used for five purposes, including the "betterment of the conditions of native Hawaiians." On this legal basis the DHHL provides programming including native Hawaiians homesteading and leases land such as the subject site to create funding for these programs.

The current project area remained undeveloped until March 6, 1966 when Canadian Pacific Corporation, formerly Hawaiian Timber Company, obtained a 40-year lease from DHHL to operate a saw mill specializing in koa. Six structures were constructed in support of the saw mill. These are some of the structures that can be seen on the property today. The saw mill continued its operation until the early 1980s.

The lease between DHHL and Canadian Pacific Corporation was subsequently assigned to Akana Petroleum on July 31, 1985, and soon thereafter Akana Petroleum commenced operations as a jobber of Chevron petroleum products and continues to operate on the study property.

If still present, the natural vegetation within the study area would consists of 'ōhi'a, tree fern, uluhe fern, and guava. Currently, the study area exhibits a limited vegetation cover of exotic weeds and grasses. The entire project area appears to have been substantially graded in the past. There have been several metal and wooden industrial structures built on the property *(Figure 3.7).*

Potential Impacts and Mitigative Measures

Based upon the Rechtman LLC archaeological and cultural study conducted for this assessment in October 2008 and previous cultural impact studies in the area, there are no known traditional cultural properties or cultural practices being conducted at the proposed project area. The landscape today reflects its industrial history. Consequently, the proposed project is not expected to disturb or otherwise impact cultural properties or practices. Based upon the history

of the land and the current status of the land, no individuals were contacted or interviewed for this Cultural Impact Assessment.

A letter was sent ~~has been sent~~ to SHPD requesting a determination of "no historic properties affected,"~~.~~ and SHPD determined that no historic properties will be affected by this project because:

1. Residential development / urbanization has altered the land.
2. Previous grubbing / grading has altered the land.
3. A site visit conducted by Rechtman Consulting LLC, an archaeological company on September 15, 2008 determined that there are no historic properties present, and SHPD concurred (Log No. 2009.0038, Doc No. 091MD27).

Should any cultural access activities for traditional and customary activities on the subject property come to light, individuals involved will be given due consideration in accordance with Hawai'i State Constitution, Article XII, section 7.

Figure 3.7 Wooden Industrial Structures on Property

3.2.3 Social and Economic Impacts

The 2003 *Land Use and Market Analysis for Hilo Commercial Center* prepared for DHHL by Belt Collins and Wendell F. Brooks, Jr. includes economic and social concerns relevant to the proposed development though the subject site lies just to the east of the report study area. A copy of this report is not included in the appendix.

They report the following conclusions about the East Hawai'i regional economy and the commercial real estate market:

- The regional economy is more or less stable with a bias toward slow to modest growth, absent any major external social, political or economic shocks.
- Hilo is the social, political and economic center of the region.
- The majority of commercial properties in the Hilo area are old and many are functionally obsolete.

- Commercial activity in Hilo has shifted and/or is shifting to the Kanoelehua Corridor in part due to the concentration of large retail facilities in that area.
- An opportunity exists in the Kanoelehua Corridor to capture a large percentage of any future growth and/or a portion of the remaining Hilo commercial market through incremental mixed use (retail/industrial) development possibly anchored by an additional Big Box discount or value retailer.

From 1900, the population grew in each decennial period until 1940 when it peaked at 73,276. In 1960 the population reached a ~~its~~ low point at 61,332 and grew modestly in 1970. The population then jumped by 46% in 1980, 30% in 1990 and 23% in 2000 to 148,667 persons. In 2003, the population was approximately 150,400 persons.

While Hilo remains the island's political center, the emergence of the West Hawai'i economy has shifted attention to Kailua-Kona. The expansion of the West Hawai'i resort related economy has generally coincided with the demise of plantation agriculture in East Hawai'i. Many former sugar workers have been retrained and are now commuting from their homes in East Hawai'i to their jobs in West Hawai'i.

The report cites figures from American Fact Finder, U.S. Census Bureau P53, indicating that the lowest income areas are in or near Downtown Hilo and in South Puna. The total unemployed in July 2003 totaled 3,550, or 8.9% of the 37,450 person East Hawai'i work force, which is about 49.6% of the County's total work force. The 3,550 unemployed represented 69.6% of the Big Island's total unemployment. Delicate as the subject may be to discuss, it is nonetheless generally believed that there is a substantial "underground economy" in Puna. The significance is that, for better or worse, published data may not account for all economic activity. In fact, the spending of retirees/second home owners and the underground economy may contribute substantially more to the economy than is acknowledged.

The Kanoelehua Corridor includes the proposed project site and extends roughly from the intersection of Kanoelehua Highway and Kamehameha Avenue near the Harbor to Kea'au Village. Prince Kūhiō Plaza, Wal-Mart/Waiākea Shopping Plaza, and Home Depot, adjacent to the subject site, are transforming the Kanoelehua Corridor into the retail core of Hilo. Wal-Mart/Waiākea Kai Shopping Plaza opened in 1998. According to the *Land Use and Market Analysis* report, new retail outlets with new products can cause the market to grow even without population growth or growth in personal income. Home Depot in the Kanoelehua Corridor would further strengthen the area as Hilo's retail center, reduce leakage, and quite possibly expand the market even further. In analyzing the situation, the Consultants conclude that the developers and operators at Wal-Mart and Home Depot recognized that there was an underserved market for value retail merchandise. That observation is compatible with income levels of the Trade Area. These store operators no doubt also observed from sales in other stores that there was a substantial amount of leakage out of the area to West Hawai'i and Honolulu.

However, the Consultants reason that the retail market for East Hawai'i is finite and that it is not likely that an unlimited number of large retailers would be attracted to the area. It is estimated that there may be only one or two additional opportunities for another large

(approximately 10 acres) user beyond Home Depot such as Target to lease space in the foreseeable future.

Potential Impacts and Mitigative Measures

DHHL, as the landowner, will lease the approximately 15.574-acre parcel to Target Corp. and Safeway Inc. The primary existing lessee, Akana Petroleum, has agreed to relocate to another nearby site. The lease period is fixed for the first 25 years and will be renegotiated for the remainder of the term. The property will be leased for $586,460 per year for the first decade and then rises every five years to $727,686, $823,304, and then tops out at $931,486 from the 21st to the 25th year. The project as proposed is expected to generate $18.1 million over the next 25 years to serve DHHL's native Hawaiian beneficiaries.

The proposed development will provide short-term jobs during the construction phases as well as long-term jobs in operation and management for East Hawai'i residents. In addition, indirect jobs will be created within industries supporting and supplying inventory. We recommend that Target and Safeway note the community suggestion to give preference to locally grown and manufactured products. Providing jobs closer to residences may reduce traffic congestion from workers commuting from East Hawai'i to West Hawai'i.

According to the 2003 *Land Use and Market Analysis for Hilo Commercial Center*, the market can absorb another large store such as Target. The proposed development contributes to the growing retail core of Hilo along the Kanoelehua Corridor.

The project has the potential to grow the retail market without impacting population growth by providing options to customers who may otherwise take their business to West Hawai'i or off-island. The proposed project may create a limited increase in population through employment opportunities related to its construction and operation. There may be secondary population impacts in that the jobs and stores may bring more people to area as residents or shoppers. This limited potential increase in population is not considered a significant impact.

3.3 INFRASTRUCTURE AND PUBLIC SERVICES

3.3.1 Utilities

A civil report is provided in Appendix A. The Electric service provider for this project will be Hawai'i Electric Light Co. (HELCO). The Data and Telecommunication ~~Telephone and Cable TV~~ service provider will be Sandwich Isle Communications (SIC). Oceanic Time Warner will provide cable television services. A "central office" type facility for SIC is located on Railroad Avenue across from project site. Adequate service capacity should be available from existing underground infrastructure on Railroad Avenue.

Potential Impacts and Mitigative Measures

Based on discussions with HELCO's representatives, a new substation may be required for the proposed project. HELCO's preference is a site fronting Railroad Avenue within 1 to 2 miles of the project site. The minimum size of a utility easement to HELCO is 150 feet by 150 feet.

An underground infrastructure system for Electric and Telephone/CATV services is recommended for both buildings presented in the conceptual site plan. If the project moves

forward, the infrastructure system will consist of "empty" concrete encased ductlines and handholes. Concrete pads for HELCO's equipment and transformers will also be required. HELCO and SIC will provide the "cabling" in the infrastructure system. The cost of "cabling" will be at the developer's expense.

Lighting standards are required to be low pressure sodium lamp sources to comply with the Hawai'i County Outdoor Lighting Ordinance.

3.3.2 Potable Water

Water service near the Pana'ewa Industrial Lots is provided by the County Department of Water Supply (DWS). The water used in this area is supplied from the DWS 1.0 million gallon Pū'ainakō Reservoir located between Komohana and Kāwili Streets on Pū'ainakō Street. From this reservoir, an 18-inch transmission main runs along Pū'ainakō Street to Railroad Avenue, and then 12-inch and 8-inch lines are used to service the local area including several existing service laterals on both streets. DWS confirmed the location of water lines in the area.

Existing waterline layout and locations of existing appurtenances near the project site *(Figure 3.8)*. While two of the fire hydrants on Railroad Avenue are in useful proximity to the proposed development, none of the existing service laterals can be of use to the proposed development because they are of insufficient size. A benefit the existing service laterals do provide is as credit toward the proposed development's water facilities charge.

There are no private residential wells or other wells are located on the subject property. However, there are 16 USGS wells and 15 State database wells within one mile of the property. There are no public water supply system wells within one mile of the site and no well locations on the site.

Potential Impacts and Mitigative Measures

A request for a lateral connection for domestic service will be made to the Department of Water Supply's main located along Maka'ala Street. Currently there are no detailed drawings with fixture units to calculate the proposed project's specific water demand, so acceptable demand levels have been obtained from the domestic consumption guidelines in Table 100-18 of the State of Hawai'i Water System Standards dated 2002.

This project is proposed to be developed under Commercial/Industrial Mixed Use zoning designation, and since the DWS Water System Standards have no guidelines available for this zone on the island of Hawai'i, the island of O'ahu guidelines are used. The O'ahu guideline for average daily demand is 100 gallons per 1,000 square feet (sq.ft.). At the time of preparation of the civil engineering *Project Assessment Report for DHHL East Maka'ala Mixed Use Development* for this report by Okahara and Associates in October 2008, the proposed building on-site had an area of 180,000 square feet, though final building plans are subject to change. With new information available, water demand for the proposed development is calculated as:

Target:	160,000 sq.ft. x (100 gallons/1,000 sq.ft.)/day	= 16,000 gallons/day
Safeway:	60,000 sq.ft. x (100 gallons/1,000 sq.ft.)/day	= 6,000 gallons/day
Total proposed project potential water demand		= 22,000 gallons/day

The practicality of this estimate has been measured against the Kona, Hawai'i Costco store, which is most comparable in this case to the proposed Target store. Costco's average daily demand from the beginning of 2005 to the end of 2006 was 18,267 gallons/day; therefore, 16,000 gallons/day is believed to be a reasonable water demand rate for the discount general merchandise store (Target), and by extension, the formula is presumably adequate for predicting the demand for the Safeway supermarket. The County of Hawai'i Department of Water Supply confirmed that they are able to supply the total average daily demand for the proposed Safeway and Target stores of 27,340 gallons per day, which is equivalent to 69 units of water at 400 gallons per day per unit.

The fire flow requirements for an industrial development on the island of Hawai'i are 2,000 gallons per minute (gpm) for two hours. However, according to the Fire Department, since the proposed building encompasses a significant area, the flow requirement can be lowered to 1,500 gpm if the entire building has a sprinkler system per NFPA 13 standards.

The County of Hawai'i Department of Water Supply has confirmed the existing waterlines on Railroad Avenue and East Maka'ala Street are adequate to provide the required 2,000 gallons per minute fire-flow as per the Department or Water Supply Water System Standards for commercial or industrial land use. A separate fire meter for onsite fire hydrants and sprinkler system will also be installed. Water supply will be provided in accordance with UFC section 10.301(c) relating to fire flow for fire protection.

Based on the calculated water demand rate, the modified fire flow requirement, and Water System Standards sizing guidelines, the proposed waterline is adequately sized. Per DWS's recommendations, ~~T~~the proposed waterline will connect to the existing ~~8~~ 12" waterline along Railroad Avenue or the existing 8" waterline within Maka'ala Street, as confirmed for access by the Department of Water Supply, and will run along the north, east, and south sides of the proposed building *(Figures 3.8 and 3.9)*. Water demands and calculations will be provided to the Engineering Division of the State of Hawai'i Department of Land and Natural Resources for inclusion in the State Water Projects Plan Update.

3.3.3 Wastewater and Runoff

Sewer service to the subject property is provided by the County of Hawai'i Department of Environmental Management. The closest existing sewerline to the proposed development is an 8-inch sewerline running along East Maka'ala Street. This sewerline ends at the west entrance to Home Depot (entrance closest to Kanoelehua Avenue/Volcano Highway), where it connects to the Home Depot site. The rest of the existing sewerline runs west along Maka'ala Street, crosses Kanoelehua Avenue, then runs in a northerly direction through Hilo's Industrial Park area and some residential poperties. The sewerline changes from an 8-inch to a 12-inch line, and at Leilani Avenue, the sewerline increases to a 36-inch line. *Figure 3.8* shows the location of the existing sewerline near the site. The full flow capacity of the Maka'ala Street sewer line is unclear at this time.

Topography in the project vicinity indicates that off-site runoff flows toward the project site in a northerly direction. Therefore, the only possible off-site runoff affecting the site would flow across East Maka'ala Street, where it is handled by ten existing catch basins and modified catch

basins/drywells bordering the site. Current stormwater runoff from the site is approximately 25cfs.

Potential Impacts and Mitigative Measures

The County of Hawai'i Department of Public Works is unsure if the existing sewerline on East Maka'ala Street described above can handle additional discharge. No calculations from past projects are available from the County at this time. Prior to planning any sewerline connections, the county proposes to have a study performed on the existing sewerline up until the crossing at Leilani Avenue based on actual water usage rates. The concern is that although the average daily flow rates do not appear to be a problem, the calculated design peak flow may be over the capacity of the existing sewerline. The capacity of a sewerline must be able to handle the design peak flow. This sewer study is considered to be a project in itself that could take several months.

Another proposal from the County of Hawai'i is the construction of a new sewerline running northerly along Railroad Avenue until the intersection at Leilani Avenue. The sewerline would continue westerly along Leilani Avenue, cross Kanoelehua Avenue, and connect to the existing 36-inch sewerline previously described. This proposal is in need of discussion between the Department of Water Supply and the Department of Hawaiian Home Lands. A potential problem for this proposed sewerline is a dip in the road along Railroad Avenue.

Because the proposals described above need to be further discussed, this report does not include a sewer system layout for the proposed development.

Additional stormwater discharge resulting from the proposed development is estimated to be approximately 100cfs. The Project will comply with the requirements of the Clean Water Act, including the rules under HAR, Sections 11-54 and 11-55. A National Pollutant Discharge Elimination System (NPDES) permit is required for discharges of wastewater including with stormwater runoff. Stormwater runoff quality may be improved by the proposed development because the storage tanks, abandoned cars, and refuse present at the site would be removed.

One possible option for managing site stormwater is the installation of drywells throughout the proposed development. Additional drainage measures to facilitate drywell stormwater management include constructing swales within the main parking lot to direct stormwater into drywells, installing downspouts on the building, and site grading to direct runoff either into the appropriate proposed drywells or off the site in the natural direction of flow.

Low impact development techniques leading to a more sustainable stormwater management plan are suggested. Sustainable stormwater runoff mitigation measures that could be employed include pervious pavement and pavers in overflow areas, non-curbed vegetated swales, bio-retention basins for slow release of stormwater, and green roofs on the proposed development. Though the civil engineer's report notes that pervious pavement has not been employed often in Hawai'i, installation could be successful with proper site analysis and appropriate application.

3.3.4 Solid Waste Disposal

The amount of solid waste expected to be generated ~~operation~~ from the proposed development's operation has not been calculated. The type of solid waste will be related to the operation of the type of commercial activity typical of Safeway and Target stores. The developers of the proposed project will have to haul solid waste or use private contractors.

Potential Impacts and Mitigative Measures

Solid waste generated by construction activities will be disposed of according to State and County regulations. To the greatest extent practicable, the contractor shall be instructed to develop a job-site recycling plan for construction and recycle as much construction and demolition waste as possible. The developer is also encouraged to incorporate provisions for recycling into the project, utilizing a collection system and space for bins for recyclables. Where practical, the project will recycle waste such as cardboard and other packaging materials.

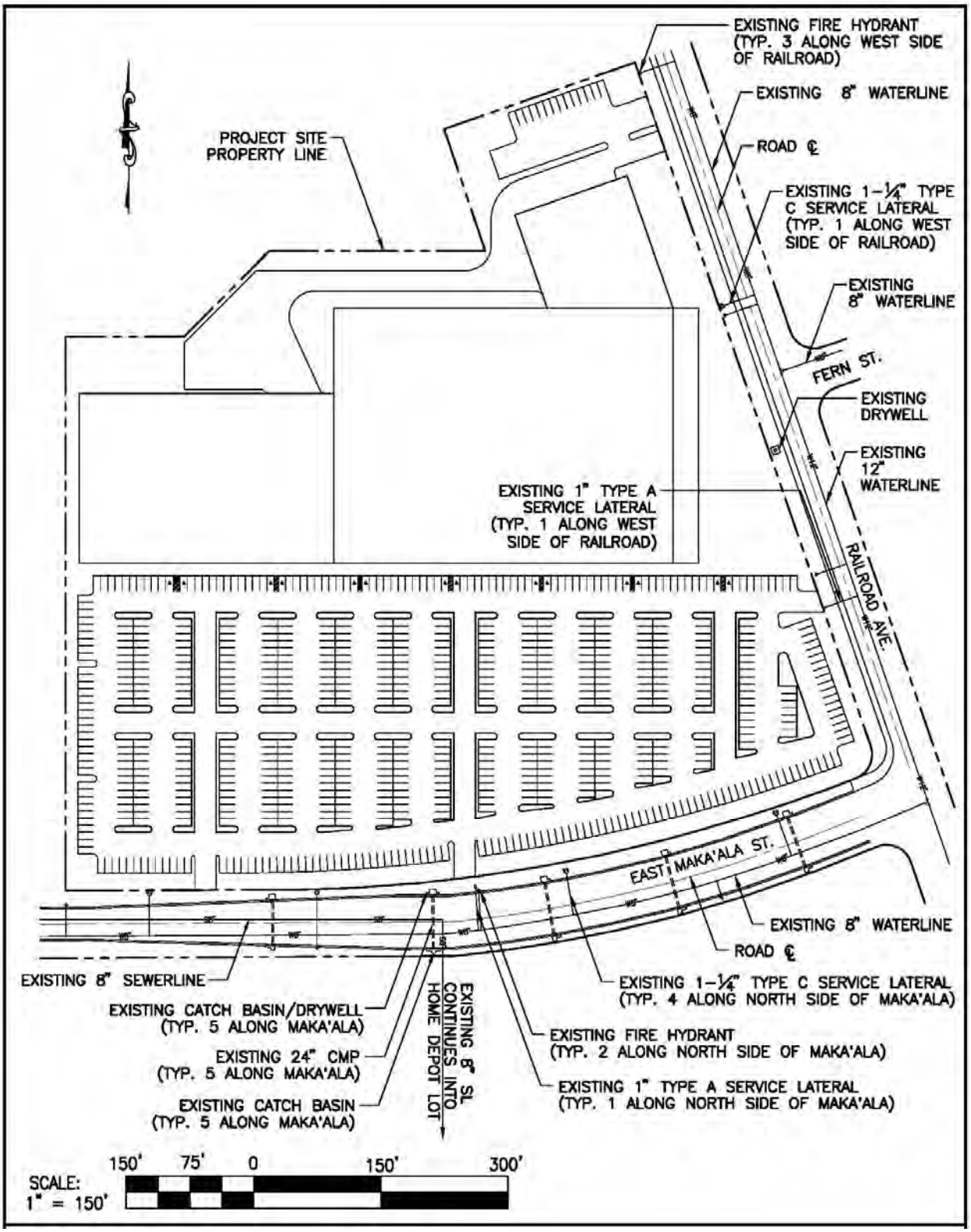

Figure 3.8 Existing Drainage Structures and Utilities

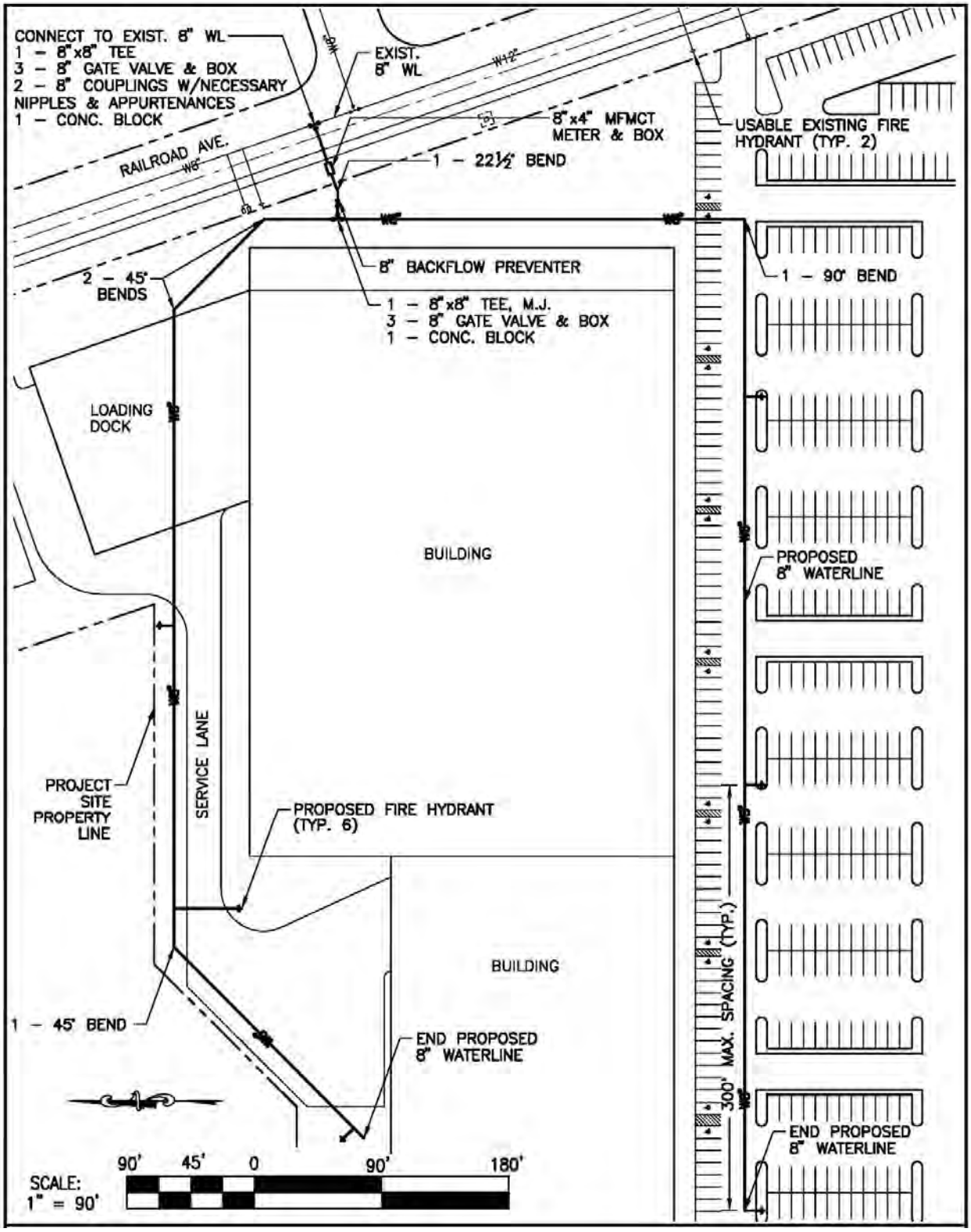

Figure 3.9 Proposed Waterline Layout

3.3.5 Roads and Traffic

Traffic engineering analysis by M & E Pacific, Inc. in November of 2008 and as significantly updated in March of 2009 (*Appendix C*) describes the roadways system, traffic, and related challenges as follows:

The proposed project site is northwest of the intersection of Railroad Avenue and East Maka'ala Street in a block bound to the North by Pohaku Street/Kukila Street and to the West by Kanoelehua Avenue. This parcel is located in an area adjacent to other major retailers.

Primary access to this retail area from other areas of Hilo and Hawai'i Island is provided by Kanoelehua Avenue to the west of the subject property and Pū'āinakō Street to the south of East Maka'ala. Kanoelehua Avenue is a major arterial that provides north-south access between Hilo and the Kea'au and Volcano districts. Pū'āinakō Street is on an east-west alignment that begins at Railroad Avenue on the east and merges into Kaumana Drive ~~terminates at Komohana Street~~ on the west. The four lane section between Kanoelehua Avenue and Railroad Avenue is named East Pū'āinakō Street. The remaining section west of Kanoelehua Avenue is named West Pū'āinakō Street.

Railroad Avenue is a two lane roadway running parallel to and east of Kanoelehua Avenue. It provides access from an industrial area in the north to an agricultural park to the south. Ohuohu Street is a two lane local road that runs north to south behind the Prince Kūhiō Plaza. It provides secondary access to the Prince Kūhiō Plaza and a satellite parking lot and connects East Maka'ala Street with East Pū'āinakō Street and the adjacent residential area to the south.

The Kanoelehua Avenue and East Pū'āinakō Street intersection and the intersection of Kanoelehua Avenue and East Maka'ala Street are controlled by traffic signals. The intersection of Kanoelehua Avenue and Pohaku Street is not signalized. The four study intersections on Ohuohu Street and Railroad Avenue are stop sign controlled. Ohuohu Street has stop signs at its approaches to East Maka'ala Street and East Pū'āinakō Street. The East Maka'ala Street and East Pū'āinakō Street approaches to Railroad Avenue are stop sign controlled. The driveways of the Home Depot Store, Waiākea Center, and Prince Kūhiō Plaza are not signalized.

The State Department of Transportation (SDOT) is undertaking the Pū'āinakō Street Widening Project from Kaumana to Kilauea Avenue in phases. A new mauka roadway between Komohana Street and Kaumana has been completed, and the roadway section between Kanoelehua Avenue and Kilauea Avenue has been widened to four lanes. The State is working from mauka to makai to complete the project. They are currently designing a new roadway section between Komohana Street and Kāwili Street west of the current alignment. The intention is to widen the two lane roadway section between Kāwili Street and Kilauea Avenue to four lanes. The Statewide Transportation Improvement Program, FY 2008 through 2011, shows two separate right of way acquisitions from Komohana Street to Kāwili Street and from Kanoelehua Avenue to Komohana Street programmed in FY 2013. The remainder of the project has not been programmed, and SDOT staff is not able to provide a completion date for the entire project.

SDOT is also planning for the future widening of Kanoelehua Avenue to six lanes from Volcano to Kamehameha Avenue by preserving the future right of way from development by adjoining

landowners. An additional right of way for a bikeway along is included in SDOT's plans for the street widening project.

There are several projects being considered adjacent to the study area. To account for the additional traffic which would be generated from these properties the annual traffic growth rate was increased to 1.0% for the purposes of this study.

Potential Impacts and Mitigative Measures
DHHL and its tenant(s) will mitigate traffic impacts created by this development on existing roadways as would any private developer pursuant to section IV (F) of the County of Hawai'i/DHHL Memorandum of Agreement. Onsite infrastructure will be upgraded to accommodate the new use. The need to upgrade offsite infrastructure will be assessed in cooperation with the County of Hawai'i, and DHHL will bear its fair share of these improvement costs.

The conceptual plan identifies access to the project site from two driveways along East Maka'ala Street and one driveway from Railroad Avenue. Driveways along East Maka'ala will provide customer access to the project site and should be aligned with the Home Depot driveways along East Maka'ala. The driveway from Railroad Avenue will lead to the loading dock, building, and 14 additional standard parking spaces. The main parking lot is planned at the southern edge of the project site and can accommodate approximately 712 standard parking spaces, 14 handicap accessible parking spaces, and curbed or uncurbed islands, depending on further site development analysis. The connection of the access driveways will be coordinated with the County.

Traffic related anticipated impacts and suggested mitigation strategies are based upon estimated store sizes available at the time of preparation (March ~~November~~ of 2009~~8~~) and are subject to change. The analysis provided by M & E Pacific, Inc. is summarized as follows:

The proposed project is assumed to be occupied in about four to five years. During this period, ambient traffic on the area roadways can be expected to increase due to regional growth and new projects in the area. In the study, traffic generated from the proposed project was added to the ambient traffic forecast to obtain the total with project traffic forecast. Based on the location of the proposed project site, eight intersections were chosen for analysis *(Figure 3.10).*

At the time of preparation, the proposed project was to consist of a 12~~6~~0,000 square foot stand-alone discount superstore (Target) and a 60,000 square foot supermarket (Safeway). The expected trip generation was calculated at: 296 vehicles per hour (vph) in the weekday morning, 1234 vph in the weekday afternoon, and 1556 vph in the Saturday midday. The proposed development has increased to 220,000 ~~180,000~~ sf, and changes are reflected in this revised FEA and in the revised Traffic Impact Analysis for this project ~~will be recalculated based on~~ based on the Institute of Transportation Engineers Trip Generation Handbook report rates ~~for the Final EIS~~. This new project size, a 22% increase in floor area, increases expected traffic generation to 327 vph on weekday mornings, 137 vph weekday afternoons, and 1858 vph Saturday midday. These increases represent an 11% increase during the morning peak, a 16% increase in the afternoon peak, and a 19% increase in the weekend traffic flows. However, the traffic consultants recognize that the actual number of trips generated in the future may be lower,

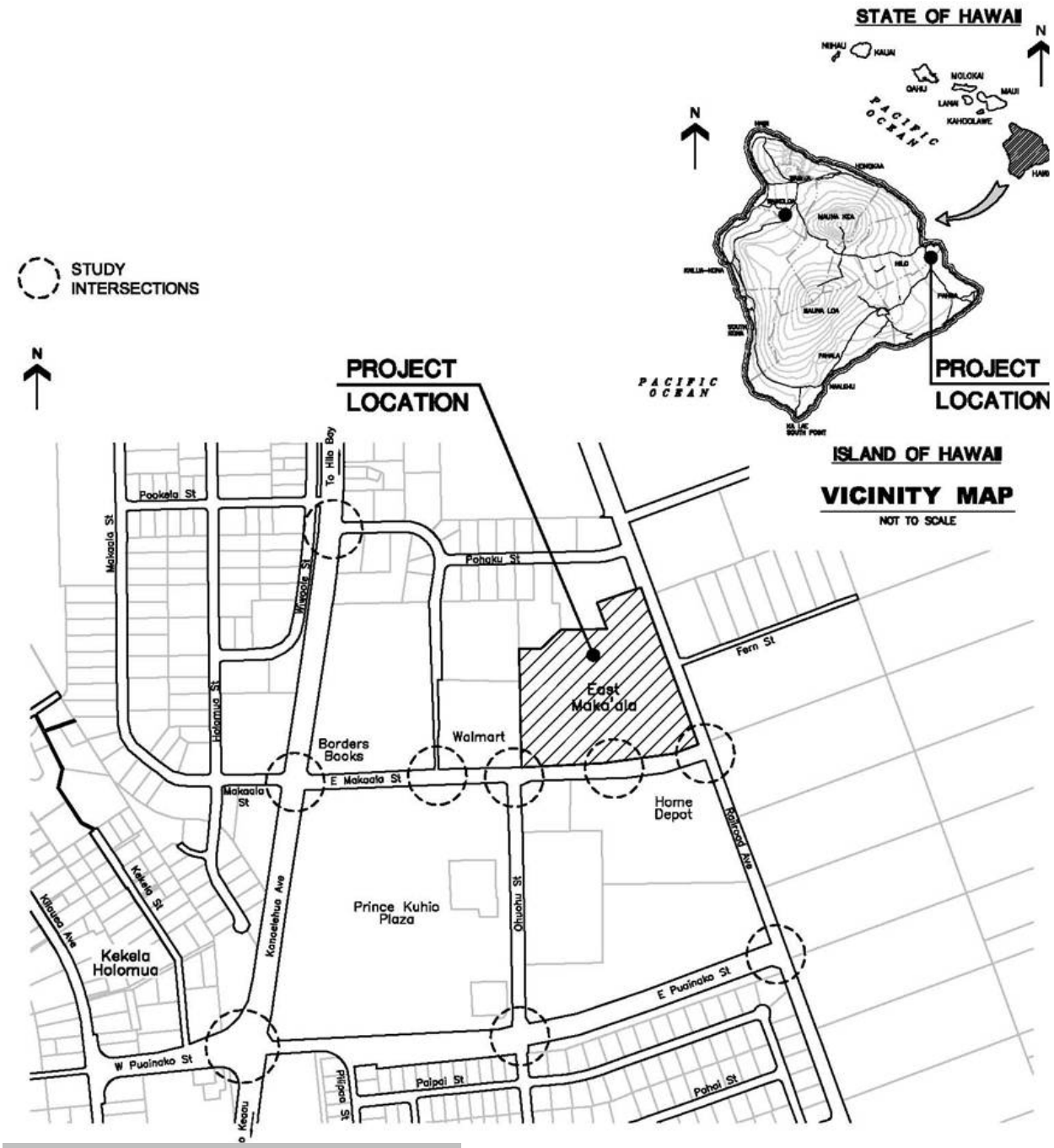

Figure 3.10 Traffic Intersections Studied

based on evidence that the Home Depot store is not generating as many trips as forecast using the Trip Generation report.

Most of the trips created by the proposed project are projected to be new trips in addition to existing traffic. Approximately 30% of the trips may be attributed to pass-by and diverted trips, or vehicles traveling in the vicinity for other purposes which stop at the proposed commercial center.

Because of the vehicular access points to Prince Kūhiō Plaza and Border's Books at the west end of Maka'ala Street, left turn movements to either enter or exit these businesses are difficult due to present traffic levels in the area and may become more challenging with the construction of the proposed project. This same concentration of commercial traffic may also have a negative impact on traffic flows at the intersection of East Maka'ala Street and Railroad Avenue.

The traffic analysis indicated the need for traffic mitigation measures to accommodate the proposed project. The mitigating measures recommended at each intersection are summarized below.

- Kanoelehua Avenue: A third northbound lane from East Pū'āinakō Street that terminates as a right turn only lane into Pohaku Street would help alleviate congestion during morning rush hour and weekends. Sidewalks and bikeways may be included on the east side of Kanoelehua Avenue depending on demand and feasibility.

- Kanoelehua Avenue- Pū'āinakō Street: This intersection would require major roadway improvements to mitigate existing capacity problems and accommodate future traffic forecasts. A third northbound lane on Kanelehua Avenue, ~~D~~double left turn lanes on both Pū'āinakō Street approaches and two through lanes on the eastbound approach of West Pū'āinakō Street are needed to properly mitigate the future traffic needs at this intersection. DOT would like to have sidewalks and bikeways on the east side of Kanoelehua Avenue, but there may not be sufficient right-of-way to permit all of these improvements.

- Kanoelehua Avenue- Maka'ala Street: This intersection is expected to accommodate future traffic with a third northbound through lane, although several movements would remain below level of service D. Other considerations including adding sidewalks and bikeways as part of the highway widening project and bringing the southbound left turn lane to standard width add considerably to the right of way requirements, as discussed for the Kanoelehua Avenue- Pū'āinakō Street intersection. ~~longer traffic signal cycle lengths~~

- East Pū'āinakō Street- Railroad Avenue: This intersection is not expected to have large traffic increases and would not require mitigation.

- East Pū'āinakō Street- Ohuohu Street: This intersection should be converted to a four-way stop when warranted.

- East Pū'āinakō Street- Pilipa'a Street- Prince Kūhiō Plaza Driveway: The plaza driveway should be converted into a right turn in, right turn out driveway to eliminate the problematic inbound left turn movement. The design of the Pilipa'a Street approach would not change.

- East Maka'ala Street- Railroad Avenue: Install all-way stop or traffic signals at Railroad Avenue when warranted. ~~Long delays could be tolerated at this intersection and should be monitored to determine whether/ when an all-way stop would be warranted.~~

- East Maka'ala Street- Home Depot Driveway- Proposed project driveway: The two project access intersections along East Maka'ala Street should be designed to provide separate left turn lanes and two through lanes in each direction. ~~Long delays for outbound left turn movements can be expected.~~

- East Maka'ala Street- Ohuohu Street: This intersection should be converted to a four-way stop when warranted and monitored to determine whether/when traffic signals would be warranted. The northbound approach of Ohuohu Street should be widened to two lanes for separate right and left turn lanes.

- East Maka'ala Street- Prince Kūhiō Plaza ~~Mall~~ Driveway- Waiākea Center driveway: Rechannelize to restrict the permitted movements at each intersection and install traffic signals at the two existing Waiākea Center driveways. ~~Provide two through lanes in each direction and study the need for traffic signalization~~.

- Kanoelehua Avenue- Pohaku Street intersection: The need for and impact of traffic signals should be studied. The westbound left turn movement from Pohaku Street should be eliminated if the intersection remains unsignalized. If signalized, outbound left turns from Pohaku Street should be banned to permit a two-phase signal operation to maximize the "green time" for inbound turn lanes from Kanoelehua Avenue. ~~The need for and impact of traffic signals should be studied.~~

- Kanoelehua Avenue Sidewalk along the frontage from Pū'āinakō Street to Pohaku Street: Providing sidewalks would increase the highway right of way requirements by approximately 10 ft and may increase pedestrian traffic. We suggest DOT study this issue further to inform its plans for widening Kaneolehua Avenue.

- Kukila Street: Kukila Street may need to be improved to accommodate higher traffic volumes.

Access management, congestion issues, and warrants for traffic signals along East Maka'ala Street will be addressed in the design phase.

Though the proposed development will contribute its fair share to traffic patterns, some of these mitigation measures address regional problems that do not solely result from the proposed development. Rather, in these cases the proposed development contributes to existing situations. ~~traffic problems exist for most of these conditions already, and the impact from the~~

~~proposed project is simply part of the whole dynamic created by development and mobility in this area of the Hilo region.~~

The mitigation measures recommended in this FEA combined with the measures created during the design phase by the project design engineer should adequately address any traffic impacts created by the proposed development.

Additionally, we note that at this point, plug-in hybrids are not readily available on Hawai'i Island, though they may be coming. We suggest consideration of including charging stations at the proposed project at the appropriate time when market demand indicates it would be practical.

3.3.6 Noise

The project site is located in an industrial and commercial area of Hilo. Existing noise in the vicinity of the project site is generally from vehicular traffic traveling along Railroad Avenue and East Maka'ala. Noise is also generated from adjacent commercial and industrial activities. On occasion, the project site is also impacted from noise generated from overhead aircraft.

Sounds of rain, wind, birds and insects can also be heard at the project site.

There are no sensitive land uses, including residential homes, in the immediate vicinity of the project site.

Potential Impacts and Mitigative Measures

Sitework and construction of improvements are expected to take 14 months. During the construction period the use of construction equipment for grading and other temporary noise-generating activities is expected to increase the noise levels on the site. This noise generation is likely unavoidable, and its levels will vary in conjunction with the types of machinery and activities necessary at the time, including sometimes of noise levels exceeding 65 dBL.

To minimize noise, all equipment will be kept in good working condition and equipped with muffling devices and other noise reducing equipment. Noise generated from construction-related activities will be limited to daylight hours. All contractors will comply with State Department of Health (DOH) noise limits including guidelines for the hours of operation of heavy equipment and noise curfew times. The DOH will be consulted, and if appropriate, the contractor will be required to obtain a permit per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.

Noise generated from the daily operation of the proposed Target and Safeway stores at the project site will not differ from noise levels generated by existing industrial and commercial use in the area. Noise from vehicular traffic including delivery trucks and consumer vehicles is ~~are~~ expected. However, long term noise generation from the development would be limited to the DOH permissible noise standards.

3.3.7 Public Services

Fire

Public fire protection is provided by the County of Hawai'i Fire Department. The nearest fire station is located at 411 Kawailani Station situated approximately two miles (two minutes) from the project site. Existing fire hydrants are located on Railroad Avenue and East Maka'ala.

Potential Impacts and Mitigative Measures

According to the Fire Department, since the proposed building encompasses a significant area, the fire flow requirement can be lowered if the entire building has a sprinkler system per NFPA 13 standards.

Provisions have been made for the construction of a fire apparatus access road in compliance with the Uniform Fire Code requirements in Section 10.207. The service lane planned to connect the building and loading docks to Railroad Avenue has a turnaround area that is adequate for the 45-foot turning radius of a fire truck.

Two of the existing fire hydrants along Railroad Avenue are close enough to the proposed building to be of beneficial use to this project, and six new fire hydrants will be installed along the new waterline at spacing intervals meeting the Water System Standards. Water system upgrades pertaining to fire protection are discussed further in Section *3.3.2*. Conceptual plans depicting the proposed waterline layout are depicted in *Figure 3.9.*

Police

Police protection services in the Hilo area are provided from the County of Hawai'i Police Department located at its main station at 349 Kapi'olani Street approximately three miles (five minutes) from the site.

Potential Impacts and Mitigative Measures

There may be an occasional and unavoidable demand for police protection services associated with the project. However, it is anticipated that the existing police service will be adequate and will not be adversely affected by the proposed development. The site will likely be designed with built-in security measures such as intrusion door alarms. On site, private security personnel will also be likely.

Heath Care Services

Various health care services in Hilo provide primary patient care to adults, women, and children. All facilities currently provide outpatient care. The nearest hospital is Hilo Hospital at 1190 Waiānuene Avenue approximately five miles (10 minutes) from the site by ambulance service. Ambulance service is available from the nearest fire station.

Potential Impacts and Mitigative Measures

There may be an occasional and unavoidable demand for health care services associated with the project. However, it is anticipated that the existing health care facilities will be adequate and will not be adversely affected by the project.

3.~~13~~ HAZARDOUS MATERIALS

In industrial areas, chemical spills due to human error are possible. The current tenants' activities related to petroleum products mean chemical spills will become less likely with the construction of the largely commercial proposed development.

3.~~13~~.1 Phase I Environmental Assessment

The Department of Hawaiian Home Lands (DHHL) retained Group 70 International to conduct a Phase I Environmental Site Assessment (ESA) of the project site *(Appendix D)*. The Phase I ESA process includes a historical review, regulatory agency and document reviews, site reconnaissance, interviews and identification of environmental concerns.

The purpose of the Phase I ESA is to provide an independent, professional opinion regarding recognized environmental conditions as defined by the American Society for Testing and Materials (ASTM) associated with the project site. This study addresses the concerns of numerous state and federal laws governing hazardous materials and toxic waste and their genesis, use, storage, release, and disposal.

A search of environmental databases pertaining to sites near the subject property was conducted. Records for the subject property as well as neighboring properties up to 1 mile around the property were searched and reviewed for previous or current environmental impacts. In response to these listings by the database search report, Group 70 requested and reviewed regulatory files for the identified properties at the of Hawai'i Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB) and Hazard Evaluation Emergency Response Office (HEER).

Records reviewed showed that sampling data collected at the Hilo Wood Treating facility, the facility directly north of the subject property, identified arsenic, chromium, copper, and hexavalent chromium in the soil.

The DOH files included a statement of work proposed by Levine-Fricke recommending additional soil sample collections to determine and evaluate the extent of vertical and horizontal contamination of Chromium, Copper and Arsenic in order to develop an effective remediation plan. The DOH documentation included a request to Hilo Wood Treating Company to inform adjacent property owners that past releases from the facility may have contaminated their property. Dated documentation reviewed at DOH ended in the late 1990s, and no other documentation on additional actions taken at the Hilo Wood Treating facility was available.

Communication with the current tenant of the proposed project site provided information that Akana Petroleum hired Will Chee Planning and Environmental to conduct a Phase I ESA in 2004/2005 on the subject property. Based on findings in that Phase I ESA, a Phase II ESA was recommended and conducted. Mr. Akana also stated that the lawyers of the parent company to Hawaiian Petroleum (Salchex Alaska) have the Phase II ESA document and that it has not been released to Mr. Akana. A copy of the existing Phase I ESA Report was acquired by DHHL.

A summary of relevant information from the Phase I study follows:

> The *Phase I Environmental Site Assessment, Akana Petroleum, Inc. Tax Map Key (3) 2-2-47:59, Hilo, Island of Hawai'i, Hawai'i, January 2005* prepared by Will Chee Planning and Environmental concludes that Hilo Wood Treating complied with the EPA's enforcement action and covered the arsenic contamination areas with an asphaltic concrete cap; however the arsenic contamination still exists under the cap. There was some indication by the results of soil sampling that the proposed project site was impacted by operations at the Hilo Wood Treating facility.
>
> Will Chee recommended an additional round of independent sampling for the property between Hilo Wood Treating and the proposed project site to determine the full extent of surface soil contamination and that the analysis should include tests for total Arsenic, Chromium, and Copper. Based on analytical results from the soil sampling event, the report recommended that a course of action be established to remediate the site and/or that a Human Health and Ecological Risk Assessment be conducted.

No documentation was available to review regarding the completed Phase II ESA or the findings of the additional sampling that may have taken place during the Phase II ESA.

The north boundary of the project site was observed with great detail. No stressed vegetation or visual or olfactory signs of contamination were present. The Hilo Wood Treating facility was paved to the property boundary adjacent to the subject site. The Hilo Wood Treating Site appeared to be down gradient from the project site; however, during times of heavy storms it is assumed from the observed gradient that elevations on the proposed project site experience pooling water in the vicinity of the northern site boundary.

Ten aboveground storage tanks (ASTs) were observed on the project site within secondary containment comprised of concrete masonry units (CMU). A crack was observed on the northwest section of the CMU secondary containment wall. No surface staining or pooling of liquids was observed within or outside the secondary containment area. As Akana Petroleum is a company that sells Chevron petroleum products, the minor staining observed on the paved surfaces of the site was not identified as a recognized environmental condition but as a result of operations.

Potential Impacts and Mitigative Measures

Based on review of environmental databases, historical maps, regulatory review, review of the completed Phase I ESA, and communication with the current tenant, a recognized environmental condition exists on the north property boundary of the project site *(Figure 3.11).*

The Phase II ESA Document and its findings are recommended for obtainment by the future developer of the property to identify whether the lateral and horizontal extent of contamination includes the project site and to determine best management practices in terms of remediation, containment, and disposal during the construction and operational life of the structures. We recommend that the developers, Department of Hawaiian Homelands, and the County make a concerted effort to notify the public of the findings of the Phase II ESA and any resulting remediation measures.

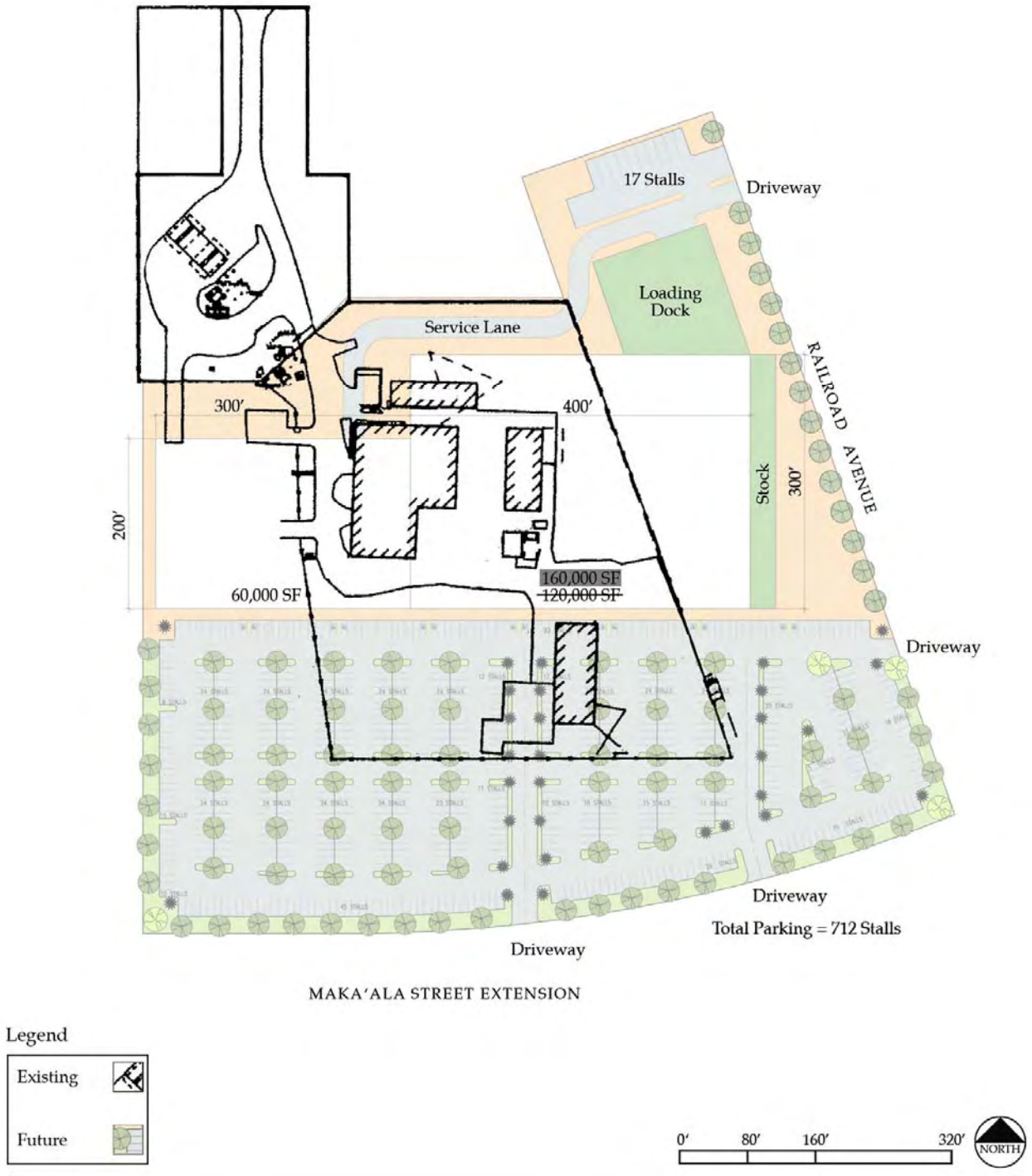

Figure 3.11 Phase I Impact Area

3.5 POTENTIAL CUMULATIVE AND SECONDARY IMPACTS

The proposed development is one of the priority area proposals for DHHL as identified in the Draft Pana'ewa Regional Plan. It is only one of several improvements planned in this area. The Department of Hawaiian Home Lands continues their efforts to provide homestead opportunities to their beneficiaries, through revenue generating proposals such as this one.

The proposed development compliments the local commercial service sector by increasing the economy of scale. Vendors in the area will benefit by the draw of the new commercial activity to the area. Construction activity during the proposed project will generate direct employment as well as indirect and induced employment in construction-related industries. For long-term operations, the new development may require additional employees as well as additional goods and services from related businesses.

The proposed development brings attention for improved regional infrastructure. Given the landholding by DHHL in the area and the interest by DHHL to build live-work-play-learn communities, the Pana'ewa region can expect long term investments by DHHL in this region.

Construction activity during the proposed project will generate direct employment as well as indirect and induced employment in construction-related industries. For long-term operations, the new building may require additional employees, including faculty and staff, as well as additional goods and services from related businesses.

The lease revenue anticipated to be generated from the proposed development to DHHL is expected to have a secondary beneficial impact on the Department's capability to provide additional homesteads for its beneficiaries.

The proposed development is expected to improve the overall environmental condition of the site. Hazardous materials are expected to be addressed, and sustainable development tools and best management practices are identified to improve the environmental conditions at the site.

4.0 ALTERNATIVES TO THE PROJECT

4.0 ALTERNATIVES TO THE PROJECT

Per Hawai'i Administrative Rules, Title 11, Chapter 200, Environmental Impact Statement Rules, Section 11-200-10(6), the alternatives to the proposed action considered are limited to those that would allow the objectives of the project to be met, while minimizing potential adverse environmental impacts. The feasible alternatives must also address the project's economic characteristics while responding to the surrounding land uses that will be impacted by the project. In conformance with applicable regulations, the following alternatives, including alternative sites and uses of the property, have been identified and investigated.

4.1 NO-ACTION ALTERNATIVE

The no-action alternative would maintain the current use of the property. In this alternative, the DHHL would continue to receive lease rent from existing land uses and tenants. A commercial/industrial development would not occur, and the potential employment and economic opportunities would not be realized. The ~~loss~~ of opportunity to generate increased lease rent to support the mission of the Department would not be realized.

The property would remain zoned MG-1a, General Industrial District, which in the County of Hawai'i applies to areas for uses that are generally considered to be offensive or have some element of danger.

The no-action alternative would maintain existing vegetation and site conditions as allowable under current lease agreements. There would be no change to existing human or built conditions.

4.2 ALTERNATIVE USES

Feasible alternatives to the proposed development are those that would support the following criteria:

- Supports DHHL's desire to lease the subject parcel for development at its highest and best use, which has been designated as an industrial/commercial mixed use zone under the County of Hawai'i's MCX District zoning requirements. The Hawai'i County Code identifies permitted uses with the MCX zoning districts. Per Section 25-5-132, permitted uses within the MCX district include: Agricultural products processing, minor; Amusement and recreation facilities, indoor; Art galleries, museums; Art studios; Automobile sales and rentals; Automobile service stations; Bars, nightclubs and cabarets; Broadcasting stations; Business services; Car Washing; Catering establishments; Cemeteries and mausoleums, as permitted; Churches, temples and synagogues; Cleaning plants using only nonflammable hydrocarbons in a sealed unit as the cleaning agent; Commercial parking lots and garages; Community buildings, as permitted under section 25-4-11; Convenience stores; Data processing facilities; Display rooms for products sold elsewhere; Equipment sale and rental yards; Farmers markets; Financial institutions; Food manufacturing and processing; Home improvement centers; Ice storage and dispensing facilities; Kennels in sound-attenuated buildings;

Laboratories, medical and research; Laundries; Manufacturing, processing and packaging establishments, light; Medical clinics; Meeting facilities; Model homes; Mortuaries; Motions picture and television production studios; Offices; Personal services; Photographic processing; Photography studios; Plant nurseries; Public uses and structures, as permitted under section 25-4-11; Publishing plants for newspapers, books and magazines, printing shops, cartography and duplicating processes such as blueprinting or photostatting shops; Repair establishments, minor; Restaurants; and Retail establishments

- Responded to DHHL's public bid process whereby the DHHL sought applications for the construction, operation and management of an industrial/commercial mixed-use development and related facilities on this parcel. Improvements and uses would conform to those allowed in a MCX zoning district and all applicable permit requirements consistent therewith. The applicant that best meets DHHL objectives and criteria and who submits the highest rent proposal which meets or exceeds the minimum upset rent set for the first twenty-five years shall be given the opportunity to negotiate a lease for the property.

- Uses for home improvement center, lumberyard or hardware store uses were dismissed per a "non-competitive provision" in the lease agreement with the Home Depot Center located across Maka'ala Street.

- Proposed uses that are controversial, incompatible with the character of the surrounding neighborhood, or create significant negative impacts on the community would be denied. DHHL also determined that residential uses on this site were not compatible with its objectives.

Other alternatives that have been suggested and discussed are agriculture and agricultural-related uses:

- Although at one time the site was designated for agricultural use, it has been designated as State urban for a long time. The proposed project site is within the County's General Industrial Zoning district where farming is not a permitted use, though the processing of agricultural products is allowed. The subject site is already heavily impacted by neighboring and past uses and is not optimal for food propagation. The SCS soil classification identifies the soil as Pāpa'i stony clay muck which is considered poor for topsoil with fragmented 'a'ā lava at depths of less than 10 inches. While agriculture is possible, this is not prime agricultural land. The Pana'ewa Regional Plan designates the site as an industrial/commercial development area.

The proposed development site is not adjacent to agricultural uses, making it an unlikely candidate for alternative uses related to agriculture, including agricultural products processing, minor; farmers markets; and food manufacturing and processing. Other DHHL land is available for agricultural uses in the vicinity. Pana'ewa Farm Lots, south of the proposed project area, is an area comprised of 285 parcels encompassing 1,615 acres zoned for agriculture.

5.0 COMPLIANCE WITH APPLICABLE PLANS AND POLICIES

5.0 COMPLIANCE WITH APPLICABLE PLANS AND POLICIES

An important consideration in evaluating the potential impacts of a proposed action on the environment is how it may conform or conflict with approved or proposed land use plans, policies, and controls for the affected area. The relevant State of Hawai'i and County of Hawai'i land use plans, policies and ordinances are described below.

5.1 STATE OF HAWAI'I

5.1.1 State Land Use District

Under the Chapter 205, HRS, all lands of the State are to be classified in one of four categories: urban, rural, agricultural, and conservation lands. The State Land Use Commission (LUC), an agency of the State Department of Business, Economic Development, and Tourism (DBEDT) is responsible for the standards and determining the boundaries of each district (Chapter 205-2(a), HRS). The LUC is also responsible to administer all requests for district reclassifications and/or amendments to district boundaries, pursuant to Chapter 205-4, HRS, and the Hawai'i Administrative Rules, Title 15, Chapter 15 as amended.

Discussion:
The State Land Use designation for the proposed project site is Urban *(Figure 1.3)*. The proposed commercial and industrial uses are allowed within the Urban District and require no district reclassification or boundary amendment.

5.1.2 Hawai'i State Plan

The Hawai'i State Plan establishes a statewide planning system that provides goals, objectives, policies, and priorities which detail property directions and concerns of the State of Hawai'i. The plan aims to coordinate Federal, State, and County plans policies, programs, projects, and regulatory measures. It is the goal of the State, under the Hawai'i State Planning Act (Chapter 226, HRS), to achieve the following:

- A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i present and future generations.
- A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

The objectives and policies of the State Plan that are pertinent to the proposed project are discussed below.

Population

Objective:

It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.

Policies:

- *Manage population growth statewide in a manner that provides increased opportunities for Hawai'i's people to pursue their physical, social and economic aspirations while recognizing the unique needs of each County.*
- *Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.*
- *Promote increased opportunities for Hawai'i's people to pursue their socioeconomic aspirations throughout the islands.*

Discussion: The proposed project may create a limited increase in population through employment opportunities related to its construction and operation. The project is not expected to significantly impact population growth because it will primarily provide options to customers who may otherwise take their business to West Hawai'i or off-island. The proposed project stimulates economic activity and contributes to the nexus of commercial and industrial development in this region of Hawai'i, thus increasing opportunities for Hawai'i County residents to pursue their socioeconomic aspirations.

Economy in General

Objectives:

- *Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.*
- *A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.*

Policies:

- *Seek broader outlets for new or expanded Hawai'i business investments.*
- *Expand existing markets and penetrate new markets for Hawai'i's products and Services.*
- *Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.*
- *Maintain acceptable working conditions and standards for Hawai'i's workers.*
- *Provide equal employment opportunities for all segments of Hawai'i's population through affirmative action and nondiscrimination measures.*

Discussion: The development of the proposed project will expand employment and economic opportunities in the Hilo Region. Equal employment opportunities and satisfactory working conditions will be the goals and policies of the occupants of the proposed development.

Physical Environment – Land, Air, and Water Quality
Objectives:

- *Maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources.*

Policies:

- *Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.*
- *Encourage urban developments in close proximity to existing services and facilities.*

Discussion: The proposed project site is in an area designated for urban growth and near other industrial and commercial uses. Recommendations for the proposed development include site design that aims to minimize stormwater runoff onsite so as to minimize pollution of surface and coastal waters.

Facility Systems – Solid and Liquid Wastes
Objective:

- *Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes*

Policies:

- *Encourage the adequate development of sewerage facilities that complement planned growth.*
- *Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.*

Discussion: DHHL and the County of Hawai'i will work together to determine the best solution for wastewater treatment to meet the needs of public health and sanitation standards while ensuring the presence of adequate facilities for handling the proposed development.

Facility Systems – Water
Objective:

- *Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*

Policies:

- *Coordinate development of land use activities with existing and potential water supply.*
- *Reclaim and encourage the productive use of runoff water and wastewater discharges.*

Discussion: The proposed waterline for this project is being planned in consultation with the Department of Water Supply. Runoff and wastewater reclamation and reuse will be considered.

Facility Systems – Energy
Objective:

- *Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people.*

Policy:

- *Promote all cost-effective conservation of power and fuel supplies through measures including: (A) Development of cost-effective demand-side management programs; (B) Education; and (C) Adoption of energy-efficient practices and technologies.*

Discussion: Energy-efficient practices and technologies are recommended for installation in the proposed development. Lighting standards will comply with the Hawai'i County Outdoor Lighting Ordinance.

Facility Systems – Telecommunications

Objective:

- *Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.*

Discussion: The Data and Telecommunication ~~Telephone and Cable TV~~ service provider for the proposed development will be Sandwich Isle Communications (SIC). Oceanic Time Warner will be the cable television provider. An underground infrastructure system for Electric and Telephone/CATV services is recommended for both buildings presented in the conceptual site plan to meet the needs of the proposed development.

Economic Priority Guidelines

- *Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy:*
  - *Seek a variety of means to increase the availability of investment capital for new and expanding enterprises which rely on economic linkages within the local economy; diversify the economy; are sensitive to community; and demonstrate a commitment to provide management opportunities to Hawai'i residents.*
- *Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:*
  - *An industry that can take advantage of Hawai'i's unique location and available physical and human resources.*
  - *A clean industry that would have minimal adverse effects on Hawai'i's environment.*
  - *An industry that is willing to hire and train Hawai'i's people to meet the industry's labor needs at all levels of employment.*
  - *An industry that would provide reasonable income and steady employment.*

Discussion: The proposed development will provide opportunities for residents to improve the quality of their lives by creating new direct long-term employment opportunities in the Hilo region. If developed at the proposed site, the project will redevelop a currently developed site in an area slated for urban development. The proposed project is not expected to have an adverse effect on Hawai'i's environment.

Priority guideline for regional growth distribution and land resource utilization:

- *Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures, and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.*

Discussion: The development is proposed in an existing urban area in close proximity to existing public facilities.

5.1.3 State Functional Plans

The State Functional Plans (SFPs) are the primary guidance tools for implementing the Hawai'i State Plan. While the Hawai'i State Plan establishes long-term objectives for Hawai'i, the purposes of the SFPs are to identify major statewide concerns; define current strategies for the functional area; identify major relationships among functional areas; and to provide strategies for departmental policies, programs, and priorities. The objectives, policies, and implementing actions of SFPs relevant to the proposed project are briefly outlined below.

State Functional Plan on Agriculture

The goal of the State Functional Plan on Agricultures is to increase agricultural development in Hawai'i in accordance with the two Hawai'i State Plan objectives for agriculture: 1) continued viability of Hawai'i's sugar and pineapple industries, and 2) continued growth and development of diversified agriculture throughout the State.

Discussion: The proposed project site is within the County's General Industrial zoning district where farming is not a permitted use, though the processing of agricultural products is allowed. The University of Hawai'i Land Study Bureau classifies the soils of the site as "Urban Land," meaning the soils have not been rated for agricultural use because they are considered to be in urban areas. The project is not in conflict with the State Functional Plan on Agriculture and will not reduce the amount of land available for or currently in agricultural production.

State Functional Plan on Energy

The State Functional Plan on Energy aims to promote energy efficiency, reduce dependence on fossil fuel, support education and policies on energy, and develop and manage energy throughout the State.

Discussion: Sustainable development measures including energy efficient design are recommended for this project. To assist the developer in sustainable green building design, the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) Green Building Rating System is suggested as a guide.

5.1.4 State of Hawai'i Coastal Zone Management Act

The Coastal Zone Management Act in Chapter 205 of the Hawai'i Revised Statutes sets policy for the coastal zone of the state including protection and perpetuation of recreational, historic, natural, and scenic resources; appropriate economic development; and reduction of devastation from coastal hazards.

Discussion: The proposed project does not fall within the coastal zone and will not adversely affect coastal areas. Recommendations to minimize stormwater runoff will protect coastal water quality.

5.1.5 2050 Sustainable Plan

The Hawai'i 2050 Sustainability Plan has as its main tenants respect for culture, character, beauty, and history of the state's island communities; balance among economic, community, and environmental priorities; and an effort to meet the needs of the present without compromising the ability of future generations to meet their own needs. The Plan delineates five goals toward a sustainable Hawai'i accompanied by strategic actions for implementation and indicators to measure success or failure. The goals and strategic actions relevant to the proposed project are outlined and discussed below.

Goal One: *Living sustainably is part of our daily practice in Hawai'i.*

Strategic Actions:

- *Develop a sustainability ethic.*
- *Conduct ongoing forums and cross-sector dialogue to promote collaboration and progress on achieving Hawai'i's sustainability goals.*
- *Continually monitor trends and conditions in Hawai'i's economy, society and natural systems.*

Goal Two: *Our diversified and globally competitive economy enables us to meaningfully live, work, and play in Hawai'i.*

Strategic Actions:

- *Will develop a more diverse and resilient economy.*
- *Will support the building blocks for economic stability and sustainability.*
- *Increase the competitiveness of Hawai'i's workforce.*
- *Identify, prioritize and fund infrastructure "crisis points" that need fixing.*

Goal Three*: Our natural resources are responsibly and respectfully used, replenished, and preserved for future generations.*

Strategic Actions:

- *Reduce reliance of fossil (carbon-based) fuels.*
- *Conserve water and ensure adequate water supply.*
- *Increase recycling, reuse and waste reduction strategies.*
- *Provide greater protection for air, and land-, fresh water- and ocean-based habitats.*
- *Conserve agricultural, open space and conservation lands and resources.*
- *Research and strengthen management initiatives to respond to rising sea levels, coastal hazards, erosion and other natural hazards.*
- *Develop a comprehensive environmental mapping and measurements system to evaluate the overall health and status of Hawai'i's natural ecosystems.*

Goal Four: *Our community is strong, healthy, vibrant and nurturing, providing safety nets for those in need.*

Strategic Actions:

- *Strengthen social safety nets.*
- *Improve public transportation infrastructure and alternatives.*
- *Strengthen public education.*
- *Provide access to diverse recreational facilities and opportunities.*

Goal Five: *Our Kānaka Maoli and island cultures and values are thriving and perpetuated.*

Strategic Actions:

- *Honor Kānaka Maoli culture and heritage.*
- *Celebrate our cultural diversity and island way of life.*
- *Enable Kānaka Maoli and others to pursue traditional Kānaka Maoli lifestyles and practices.*
- *Provides support for subsistence-based businesses and economies.*

Discussion: The proposed project has the potential to meet much of the intent of the 2050 Sustainable Plan. The developer is encouraged to incorporate sustainability recommendations for building, parking, and landscape design that will contribute to energy efficiency and minimize watershed impacts. The developer intends to support the building blocks for sustainability including actions such as recycling waste where practicable. The proposed project site is an already impacted site under current industrial use and will not contribute to loss of pristine natural areas or critical habitat for flora or fauna.

The proposed development aims to complement the Hilo community while promoting economic development goals and retaining revenue that may otherwise be lost to neighboring commercial areas or islands. Numerous employment opportunities from construction to operation and from entry level to management will be created through this development. This project supports DHHL by creating revenue to supplement DHHL's programs for Kānaka Maoli including continued homestead development for persons of native Hawaiian ancestry.

5.1.6 Department of Hawaiian Home Lands

The DHHL *Draft Pana'ewa Regional Plan*, is intended to facilitate partnerships between DHHL, other government entities, entrepreneurs, non-profits, and others in developing lands in Pana'ewa to carry out DHHL's mission. The goals of the report are to:

- *Help identify opportunities for partnerships with DHHL in the development of its Pana'ewa lands;*
- *Provide information essential to the planning of projects, services, and entrepreneurial ventures;*
- *Identify key issues, opportunities, and constraints affecting regional development and area improvements;*
- *Assist in the efficient allocation of resources by DHHL and its partners; and*
- *Identify priority projects that are essential to moving development and community improvement projects forward.*

The report identifies areas of priority including investment in developing the industrial and commercial centers at Pana'ewa.

The area designated for industrial/commercial use in the *Draft Pana'ewa Regional Plan* consists of 115 lots with a total of 396 acres in the Kanoelehua corridor. Through rents collected from these properties, DHHL is able to finance various homestead projects throughout the state.

Discussion: The proposed development is a DHHL initiative and is consistent with the regional plans as described in the *Draft Pana'ewa Regional Plan*. The property is not suitable for residential development. The parcel is suitable for revenue generation to support DHHL's mission. The propose development is expected to generate $81 million in leas rent over the next 25 years for the Department of Hawaiian Home Lands.

5.1.7 Special Management Area

The project site is not in the Special Management Area (SMA).

5.2 COUNTY OF HAWAI'I

5.2.1 General Plan

The proposed development is consistent with the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map designation for the area, "High Density Urban" use.

The County of Hawai'i Charter requires the County Council to adopt by ordinance the General Plan of Hawai'i County to guide physical development with a long-range plan reflecting desired growth patterns and characteristics. Applicable general plan goals and policies to the proposed development project are discussed below.

Economic

Goals:

- *Provide residents with opportunities to improve their quality of life.*
- *Economic development shall be in balance with the physical, social, and cultural environments of the island of Hawai'i.*
- *Strive for diversity and stability in the economic system.*
- *Strive to provide residents an opportunity for choice of occupation.*
- *Provide an economic environment that allows new, expanded, or improved economic opportunities.*
- *Strive for full employment.*

Policies:

- *Identify and encourage primary industries that are consistent with the social, physical, and economic goals of the residents of the County.*
- *Encourage active liaison with the private sector with respect to the County's requirements for establishing businesses on the island.*
- *Encourage new industries that provide favorable benefit-cost relationships to the people of the County. Benefit-cost relationships include more than fiscal considerations.*

Discussion: The proposed development will provide increased long-term direct employment and indirect support industry employment in the Hilo region in addition to short-term construction industry opportunities. This development will allow for "new, expanded, and improved economic opportunities" and will "provide residents an opportunity for choice of occupation."

The project is consistent with the Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG) map, and therefore the County's natural and social environment as designated by the General Plan. DHHL will coordinate with the County to ensure businesses established at the project site are consistent with County requirements.

Environmental Quality
Goals:

- *Maintain and, if feasible, improve the existing environmental quality of the land.*
- *Control pollution.*

Policies:

- *Take positive action to further maintain the quality of the environment.*
- *Encourage the concept of recycling agricultural, industrial, and municipal waste material.*
- *Participate in watershed management projects to improve stream and coastal water quality.*
- *Require implementation of the management measures contained in Hawai'i's Coastal Nonpoint Pollution Control Program as a condition of land use permitting.*
- *Review the County grading and grubbing ordinances to ensure that they adequately address potential erosion and runoff problems.*

Standards:

- *Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being.*
- *Federal and State environmental regulations shall be adhered to.*

Discussion: The proposed development project will adhere to all Federal, State, and County environmental regulations. The existing environmental quality of the site will be maintained through best management practices to most practicable extent. To that end, all improvements including drainage improvements will be designed to maintain, and if feasible, improve the existing quality of the site.

During construction and design, county grading and grubbing ordinances as well as the Hawai'i Coastal Nonpoint Pollution Control Program recommendations will be considered to address potential erosion, runoff, and pollution problems and to protect stream and coastal water quality.

To minimize impacts to night sky visibility and nocturnal birds, all outdoor lighting will comply with the Outdoor Lighting requirements of the Hawai'i County Code (Article 9). This includes employing low-pressure sodium lands and light shielding and adherence to operating restrictions. To the extent practicable, DHHL will encourage the concept of recycling of waste material such as cardboard to any potential developers and their tenants.

Flood Control and Drainage

Goals:

- *Protect human life*
- *Prevent damage to man-made improvements.*
- *Control pollution.*
- *Reduce surface water and sediment runoff.*

Policies:

- *Review land use policy as it relates to flood plain, high surf, and tsunami hazard areas.*
- *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.*
- *The County and the private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.*
- *Encourage grassed shoulder and swale roadway design where climate and grade are conducive.*
- *Develop drainage master plans from a watershed perspective.*
- *Where applicable, natural drainage channels shall be improved.*
- *Consider natural hazards in all land use planning and permitting.*

Discussion: Recommendations for the proposed development include low impact design review measures that require planning from a watershed perspective including grassed swales to reduce surface water and sediment runoff and pollution. Natural hazards and human health and safety will be considered in all land use planning and permitting.

Historic Sites

Goals:

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

Policies:

- *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.*
- *Public access to significant historic sites and objects shall be acquired.*
- *Assure the protection and restoration of sites on public lands other than County lands through a joint effort with the State.*
- *Consider requiring Cultural Assessments for certain developments as part of the rezoning process.*
- *Recognize the importance of certain natural features in Hawaiian cultures by incorporating the concept of "cultural landscapes" in land use planning.*

Discussion: Based on a cultural-archaeological study prepared for the proposed project site, no impacts to archaeological, historical, or cultural resources are anticipated. However, in the event that any archaeologically significant artifacts, burials, or other indicators are uncovered

during construction, work will cease in the area and the State Historic Preservation Division and other appropriate agencies, including County offices and the district representative for the Hawai'i Island Burial Council, will be contacted as pursuant to Hawaii Revised Statutes 6E and Hawai'i Administrative Rules 13-275-12 and 13-300-40.

Burials have their own unique rules under HRS 6E-43.6 and HAR 13-300. On outer islands such as Hawai'i, requirements detailed in HRS 6E43.6 must be completed within three working days of inadvertent discovery of a multiple burial sites and two days for a single burial.

As per HRS 6E-8(b), DHHL must consult with the SHPD prior to any proposed project relating to lands under its jurisdiction regarding the effect of the project upon historic property or a burial site. Correspondence between SHPD and Group 70 International regarding the proposed project is included in *7.0 Consultation with Agencies, Organizations, and Individuals*. In that correspondence, SHPD determined that no historic properties will be affected by this project because:

1. Residential development / urbanization has altered the land.
2. Previous grubbing / grading has altered the land.
3. A site visit conducted by Rechtman Consulting LLC, an archaeological company on September 15, 2008 determined that there are no historic properties present, and SHPD concurred (Log No. 2009.0038, Doc No. 091MD27).

The site does not include any known culturally significant features that could possibly detract from a cultural landscape in the area.

Natural Resources and Shoreline

Goals:

- *Protect and conserve the natural resources from undue exploitation, encroachment, and damage.*
- *Provide opportunities for economic needs without despoiling or endangering natural resources.*
- *Protect and promote the prudent use of Hawai'i's unique, fragile, and significant environmental and natural resources.*
- *Protect rare or endangered species and habitats native to Hawai'i.*
- *Protect and effectively manage Hawai'i's open space, watersheds, shoreline, and natural areas.*
- *Ensure that alterations to existing land forms, 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.*

Policies:

- *Promote sound management and development of Hawai'i's land and marine resources for potential economic benefit.*
- *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.*
- *Work with the appropriate State agencies to establish a program to manage and protect identified watersheds.*
- *Encourage the use of native plants for screening and landscaping.*

Discussion: The General Plan's Land Use Pattern Allocation Guide (LUPAG) map designates the project development site as an area for "High Density Urban" uses. The proposed development will not unduly exploit, encroach upon, or damage the County's natural resources, nor will it significantly impact the unique, fragile, and significant environmental and natural resources as it provides opportunities for economic needs.

Alterations to the site will be in full compliance with all Federal, State, and County environmental regulations to minimize adverse effects to natural resources including watersheds and to minimize adverse effects in the event of an earthquake.

DHHL will encourage potential developers and tenants to consider the use of native plants in their landscaping and screening plans.

5.2.2 Hawai'i County Zoning

The proposed project site is currently designated as MG-1, General Industrial, under the Hawai'i County zoning code as shown in *Figure 1.54*. DHHL plans to designate this site for development under the MCX zoning designation, Commercial Industrial Mixed Zoning, for planning and permitting purposes.

The purpose of the MCX district is to allow mixing of some industrial uses with commercial uses. The intent of this district is to provide for areas of diversified businesses and employment opportunities by permitting a broad range of uses, without exposing nonindustrial uses to unsafe and unhealthy environments. This district is intended to promote and maintain a viable mix of light industrial and commercial uses.

The proposed project will comply with the Hawai'i's County Zoning Code requirements for the MCX district. Buildings will not be taller than 45 feet, will be larger than 20, 000 square feet, will have an average width of 90 feet, and will maintain minimum front yard of 20 feet, as required by the County Code. The front yard will be landscaped except for necessary access drives and walks. The project site does not adjoin any building sites that would require the development to create or maintain side and rear yards.

5.3 APPROVALS AND PERMITS

During the implementation stages of the project, the applicant will work with relevant County review agencies for examination and approval of project plans and specifications.

Table 5-1 Required Permits and Approvals

Permit/ Approval	Responsible Agency
Chapter 343, HRS compliance	Department of Hawaiian Home Lands DOH Office of Environment Quality Control
Grading/ Building Permits	County Building Department
Driveway connection to County road	County Department of Public Works
Water	County Board of Water Supply
National Pollutant Discharge Elimination System (NPDES)	State of Hawai'i DOH Environmental Management Division

6.0 FINDINGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION

6.0 FINDINGS AND REASONS SUPPORTING ANTICIPATED DETERMINATION

This section describes the determination that is anticipated with respect to the whether or not the proposed project/action will have a significant impact on the environment, and the reasons for this anticipated determination.

6.1 ANTICIPATED DETERMINATION

A Finding of No Significant Impact (FONSI) is anticipated for this project.

6.2 REASONS SUPPORTING THE ANTICIPATED DETERMINATION

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact will occur. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of these criteria.

The analysis for each of these 13 criteria is summarized below.

(1) Involves an irrevocable loss or destruction of any natural or cultural resources.

No significant adverse impacts to natural, archaeological, or cultural resources are anticipated from the proposed development. The State Historic Preservation Division determined that no historic properties will be affected by the proposed project based upon past disturbance of the land and the findings of the archaeological assessment conducted for this EA. Due to previous and current uses, any potential resources have likely been impacted or lost already. The existing structures on site all date to post-1966 and are therefore not eligible for historic protections. As such, the proposed development does not involve the irrevocable commitment to loss or destruction of any natural or cultural resources. If during the course of construction, cultural or archaeological remnants are unearthed, their treatment will be conducted in strict compliance with the requirements of the DLNR.

(2) Curtail the range of beneficial uses of the environment.

The project may increase the range of beneficial uses of the environment. A possible beneficial use of the current environment might be as pervious surface and as grassland habitat in an area surrounded by and slated for further commercial and industrial use. Because of the existing pollution potential from current activities including chemical spills, leaking inoperable vehicles, and storage tanks, the pervious nature of the site may present a hazard to groundwater quality, and thus the proposed development will help eliminate this pollution possibility. Loss of pervious surfaces may be mitigated by use of low impact development design techniques in the parking lots and frontage landscaping

of the development. The habitat provided by the site in its current state is severely impacted, and thus the proposed development does not curtail the range of beneficial uses of the environment. An alternative to development might be to convert the site into a park, but given surrounding commercial-industrial uses and its current industrial land use designation, that use probably is not its highest and best use, nor does it meet DHHL's needs.

(3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.

The proposed development is intended to be consistent with State environmental policies in Chapter 344, Hawai'i Revised Statutes, the purpose of which is "to establish a state policy which will encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere~~,~~ and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i."

(4) Substantially affects the economic or social welfare of the community or State.

The proposed development has the potential to provide beneficial impacts on the social and economic welfare of the community and the state. Short-term benefits will result from the increased construction employment and purchase of construction-related goods and services. The proposed development will create new direct long-term job opportunities ~~in~~ and ~~to~~ diversify the economic base of the Hilo region. Indirect employment may be created in industries supporting or supplying the venture. The construction of the proposed project will present short-term opportunities for the construction industry. The proposed development will create revenue for DHHL that will enable housing construction for DHHL beneficiaries. Depending on the type of development, there may be negative ~~positive~~ impact to smaller local businesses in similar commercial/industrial enterprises, but the overall impact to these businesses may be mitigated by the revenue and employment growth catalyzed by the proposed development.

(5) Substantially affects public health.

The property is currently subject to hazardous materials. A Phase I Environmental Site Assessment has been completed with recommendations for Phase II Data collection and sampling to be conducted and/ or procured.

Development at this project site will mitigate and improve the environmental conditions which can be hazardous to public health.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities.

The proposed development is not expected to result in permanent residential population change. The anticipated market audience and potential employee pool are composed of existing residents within the Hilo region. There may be secondary population impacts in that the jobs and stores may bring more people to area as residents or shoppers. The

project will utilize public facilities. Infrastructure demands on public facilities are not expected to be significant. There are expected impacts from increased traffic which could ~~will~~ be mitigated with measures such as road traffic signalization and additional traffic lanes. ~~creating four-way stops and re-striping~~ Though the proposed development will contribute its fair share to traffic patterns, traffic problems exist for most of these conditions already and in these cases the proposed development is contributing to existing situations. ~~and the impact from the proposed project is simply part of the whole dynamic created by development and mobility in this area of the Hilo region.~~

(7) Involves a substantial degradation of environmental quality.

The subject site has already been significantly impacted by prior industrial use, grading, and clearing. Possible groundwater contamination from existing and previous activities on-site may be remediated through the proposed development's construction and the elimination of the existing uses. The proposed development is not expected to degrade environmental quality on-site or in the surrounding neighborhood. Appropriate best management practices will provide safeguards for the protection of water quality during construction and operation. Significant future degradation of air, water, or noise quality is not anticipated.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

There are pre-existing infrastructure and traffic issues in the vicinity. The proposed development does cumulatively contribute to the larger development of the industrial/commercial zone of this area of Pana'ewa but is consistent with State and County land use designations and regional plans designating this area for high-density industrial uses. This project is small in scale (15.574 acres) within the context of the existing development area and the overall area available zoned for general industrial use within the DHHL Pana'ewa Industrial Lots and within the other industrial parks within the Hilo region.

(9) Substantially affects a rare, threatened or endangered species, or its habitat.

It is possible that one species, the Hawaiian Hawk (*Buteo solitarius*) or 'io, listed as an endangered species under both the U.S. Fish and Wildlife Service and the State of Hawai'i's endangered species programs, and the pueo, or Hawaiian Owl (*Asio flammeus sandwicensis*), are sometimes present on the property. It is unlikely that the proposed development will have a significant negative impact on the endangered Hawaiian Hawk the endemic Hawaiian Owl because the existing habitat is not ideal for this species. There are few trees for perching, and though the grassland habitat might offer cover for rodents and other prey items usually consumed by this species, the ground has been impacted by asphalt and gravel paving, chemical spills, and is littered with immobile vehicles. The loss of the grassland can be mitigated by the positive impact of cleaning up this blighted site.

The endemic Hawaiian Petrel, or ua'u (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater, or 'a'o (*Puffinus auricularis newelli*) may fly over the project area. To reduce the potential for interactions between nocturnally flying Hawaiian Petrels and Newell's Shearwaters with external lights and man-made structures, all lighting will

comply with the lighting requirements of the Hawai'i County Code, including shielding of external lights. This mitigation measure will minimize the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters.

It is likely that the endangered Hawaiian hoary bat uses resources within the general area, though not on the subject site, as they tend to congregate around trees and groves. Bats are regularly observed in and around Hilo as well as along the coastline from Puna to North Hilo. Unlike nocturnally flying seabirds which often collide with man-made structures, bats are uniquely adapted to avoid collision with obstacles since they navigate using ultrasonic echolocation.

(10) Detrimentally affects air or water quality or ambient noise levels.

Impacts to water quality are not anticipated. Proper landscaping techniques should minimize the impacts of land alterations, reducing effects on runoff water quality. The proposed development will not create significant sources of air pollution or noise levels that would violate existing Federal or State standards. Increased traffic flows will be similar to what surrounding uses generate. Wastewater flows will be disposed of via an approved sewer system. The drainage system will be designed in compliance with County and State regulations to protect the groundwater quality and not to adversely impact downstream properties. Construction of the proposed development may improve groundwater quality through remediation of past and present use-related pollution. Sitework will be in accordance with grading permit conditions to minimize erosion, non-point-source pollution, and dust.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

The project site is approximately three miles from the shore and is not located within a floodplain or other environmentally sensitive area. Shoreline, valleys, or ridges will not be impacted by the proposed development. Natural disasters likely to impact this area are equal to the general risks present in the surrounding area.

(12) Substantially affects scenic vistas and view-planes identified in county or state plans or studies.

The proposed development will not substantially affect scenic vistas and view planes of Hawai'i County. The construction of the proposed development may improve the viewshed ~~visual~~ by eliminating deteriorating structures and provide orderly landscapes. The proposed development's design will conform to the requirements of the County zoning and building codes.

(13) Require substantial energy consumption.

The 220,000 sf proposed development will require energy consumption, but not more than would be required for projects of a similar nature according to current land use designations. It is possible that the development could employ energy conservation techniques in planning and design such as day lighting and energy efficient lighting, waste heat recovery with centralized air conditioning, and the use of proper building

orientation and landscaping, where practical, to reduce heat loads. Energy conservation measures will be implemented where practicable.

6.3 SUMMARY

As stated above, on the basis of significance criteria, the proposed development is not expected to have a significant impact on the local, County, or Statewide physical or Human Environment.

A FONSI is anticipated for this project.

7.0 CONSULTATION WITH AGENCIES, ORGANIZATIONS AND INDIVIDUALS

7.0 CONSULTATION WITH AGENCIES, ORGANIZATIONS, AND INDIVIDUALS

Respondents and Distribution	Pre-Consultation	Pre-Cons. Comments Received	Received Draft EA	DEA Comments Received	Received Final EA
STATE AGENCIES					
Department of Hawaiian Home Lands	X		X		X
Office of Environmental Quality Control	X		X		X
Department of Transportation	X	X	X	X	X
Department of Business, Economic Development & Tourism (DBEDT), Office of Planning	X		X		
Department of Land and Natural Resources (DLNR)	X		X	X	X
DLNR, Land Division	X	X	X	X	X
DLNR, Historic Preservation Division	X	X	X	X	X
Department of Health	X		X	X	X
Office of Hawaiian Affairs	X	X	X	X	X
COUNTY OF HAWAI'I					
Office of the Mayor	X		X		
Planning Department	X	X	X	X	X
Department of Environmental Management	X	X	X		
Department of Water Supply	X	X	X	X	X
Public Works	X		X		
Fire Department	X	X	X	X	X
Police Department	X		X	X	X
ELECTED OFFICIALS					
State Senator District 1	X		X		
State Representative Jerry Chang	X		X		
Hawai'i County Council District 4	X		X		
LIBRARIES					
Hilo Regional Library			X		X

Respondents and Distribution	Pre-Consultation	Pre-Cons. Comments Received	Received Draft EA	DEA Comments Received	Received Final EA
CITIZEN GROUPS, INDIVIDUALS & CONSULTED PARTIES					
Pana'ewa Hawaiian Homes Community Association	X	X	X		X
Hawai'i Chamber of Commerce	X		X		
HELCO	X		X		
Sandwich Isle Communications	X		X	X	X
Sierra Club				X	X

PRE-ASSESSMENT CONSULTATION AND DRAFT EA COMMENT LETTERS AND REPONSES

PRE-ASSESSMENT CONSULTATION COMMENT LETTERS AND RESPONSES

The response letters for the Pre-Assessment Consultation period have been updated to include the final response.

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.2984

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

September 5, 2008

SEP 12 2008

Ms. Kim Evans, Planner
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Evans:

Subject: DHHL East Makala Mixed Use Property
Pre-Assessment Consultation for Draft Environmental Assessment (Draft EA)
TMK: 2-2-47: 59 Lot 5-A-1

Thank you for requesting the Department of Transportation's (DOT) review of the subject project to develop a commercial/industrial mixed use development on a 15.5 acre parcel located on East Makala Street across from Wal-Mart and The Home Depot.

DOT's initial comments are as follows:

1. The subject project will contribute additional traffic impacts to the State highways in the area.
2. The DOT understands that a Draft EA will be prepared for the subject project. The Draft EA should provide a development plan for the proposed project that is detailed and comprehensive with, but not limited to, the description of the tenants, building to be built and construction phasing.
3. A traffic assessment or traffic impact analysis report (TIAR) should accompany and match the development plan and the project's phasing through full build out. The TIAR should cover project and cumulative impacts, as well as the mitigation measures attributable to the project.

The DOT will provide additional comments upon receipt of the Draft EA and TIAR. DOT requests four (4) copies of these documents.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Brennon T. Morioka, Ph.D., P.E., Director
State of Hawai'i
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Dr. Morioka,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 05, 2008. In response to your comments, we offer the following:

We acknowledge that the proposed development of the subject property will create additional traffic impacts to regional State highways. In the DEA a traffic assessment will accompany and match the development plan and the project's phasing through full build out. The assessment will include analysis of project and cumulative impacts and mitigation measures. The Traffic Impact Assessment Report (TIAR) will be submitted to your department for review.

With regard to full descriptions of the tenant(s), DHHL has is still finalizing the general lease agreement with Target Corp. and Safeway Inc. As such, the Draft Environmental Assessment (DEA) will include a general development plan for the proposed project that includes a conceptual building plan, but we regret that the DEA will not include a description of construction phasing because it is not yet available.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

SEP - 9 2008

September 6, 2008

Group 70 International, Inc.
925 Bethel Street 5th Floor
Honolulu, Hawaii 96813-4307

Attention: Ms. Kim Evans

Gentlemen:

Subject: Pre-assessment consultation for draft environmental assessment for East Maka'ala and Railroad Avenue Development

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Land Division, Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Morris M. Atta
Administrator

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

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AIA

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Tom Young
AIA

December 23, 2008

Morris Atta
State of Hawai'i
Department of Land and Natural Resources
Land Division, Hawai'i District
P.O. Box 621
Honolulu, HI 96809

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:059

Dear Mr. Atta,

Thank you for your comment letter of August 26, 2008. We acknowledge that you have no comments on the pre-assessment consultation document.

We appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RECEIVED
LAND DIVISION
2008 AUG 29 A 9:31
DEPT. OF LAND & NATURAL RESOURCES STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 26, 2008

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
_Office of Conservation & Coastal Lands
_x_Land Division – Hawaii District/Keith/Gavin

FROM: Morris M. Atta
SUBJECT: Pre-assessment consultation for draft environmental assessment for East Maka'ala and Railroad Avenue development
LOCATION: Hilo, Hawaii, TMK: (3) 2-2-47:59, 67, 68, 71
APPLICANT: Group 70 on behalf of DHHL

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 5, 2008.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed: Eric T. Hirano
Date: 8/29/08

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LM/MorrisAtta
REF.:PreassessConsultDEAEastMakaala
Hawaii.405

COMMENTS

(X) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program does not have any regulations for developments within Zone X.

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumitomo at (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include water demands and infrastructure required to meet project needs. Please note that projects within State lands requiring water service from the Honolulu Board of Water Supply system will be required to pay a resource development charge, in addition to Water Facilities Charges for transmission and daily storage.

(X) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments:_____

( ) Other: _____

Should you have any questions, please call Ms. Suzie S. Agraan of the Planning Branch at 587-0258.

Signed: Eric T. Hirano
ERIC T. HIRANO, CHIEF ENGINEER

Date: 8/29/08

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

August 26, 2008

RECEIVED
LAND DIVISION
2008 SEP -1 A 9:31
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

MEMORANDUM

TO: **DLNR Agencies:**
__Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
_x_Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
__Office of Conservation & Coastal Lands
_x_Land Division – Hawaii District/Keith/Gavin

FROM: Morris M. Atta
SUBJECT: Pre-assessment consultation for draft environmental assessment for East Maka'ala and Railroad Avenue development
LOCATION: Hilo, Hawaii, TMK: (3) 2-2-47:59, 67, 68, 71
APPLICANT: Group 70 on behalf of DHHL

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by September 5, 2008.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed:
Date: 9/2/08

GROUP 70
INTERNATIONAL

PRINCIPALS

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AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Eric Hirano, Chief Engineer
State of Hawai'i
Department of Land and Natural Resources
Engineering Division
P.O. Box 621
Honolulu, HI 96809

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Mr. Hirano,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated August 26, 2008. In response to your comments, we offer the following:

We appreciate the confirmation that the subject property is in Zone X of the Flood Insurance Rate Map and thus is not subject to any regulatory requirements of the National Flood Insurance Program.

To assist with the State Water Projects Plan Update, water demands and calculations will be provided to the Engineering Division of the State of Hawai'i Department of Land and Natural Resources as they become available.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL, INC.

Kim Evans
Planner

LINDA LINGLE
GOVERNOR OF HAWAII

SEP 11 2008

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

September 9, 2008

Kim Evans, Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

LOG NO: 2008.3822
DOC NO: 0809MD52
Archaeology

Dear Ms. Evans:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Pre-consultation on a Draft Environmental Assessment
Waiakea Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-2-047:059, 067, 068 & 071

Thank you for the opportunity to comment on the aforementioned project, which we received on August 29, 2008. The Hawaiian Home Lands is currently preparing a draft EA for the development of the East Maka'ala and Railroad Avenue parcel (behind Walmart).

We have a few comments at this time. You note that existing structures will be demolished to make way for new buildings; if any of these structures are over 50 years old, they will need to be documented for review by our Architecture Branch. We also note that there appears to be a problem with the TMKs as listed in our consultation letter. The TMKs (as noted above) do not all exist any more; specifically, parcels 067, 068 and 071 have been removed from the county's records. You may access the current TMKs online at http://www.hawaii-county.com/maps/tmk/zone.htm. We look forward to reviewing the Draft EA when it is available.

If you have questions about this letter please contact Morgan Davis at (808) 981-2979.

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

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AICP, LEED AP

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AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Nancy McMahon, State Archaeologist and Historic Preservation Manager
State of Hawai'i
Department of Land and Natural Resources
State Historic Preservation Division
P.O. Box 621
Honolulu, HI 96809

Subject: Pre- Assessment Consultation for Draft Environmental Assessment
DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Ms. McMahon,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 09, 2008. In response to your comments, we offer the following:

We understand your concern regarding historic nature of the demolition of existing structures to make the development proposal possible. However, the earliest development on the property dates to 1966 by Canadian Pacific Corporation-Hawaiian Timber Company, and thus no structures on the property are older than 50 years and do not warrant documentation by the Architecture Branch of your office.

We also acknowledge your concern regarding the confusion surrounding the Tax Map Key (TMK) numbers for the parcel. The correct TMK number is noted above: 2-2-047:072.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL, INC.

Kim Evans

Kim Evans
Planner

PHONE (808) 594-1888 FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD08/3798

SEP 15 2008

September 9, 2008

Kim Evans, Planner
Group 70 International Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

RE: Pre-consultation for the Draft Environmental Assessment of the Department of Hawaiian Home Lands' East Maka'ala property, Waiākea, South Hilo, Hawai'i, TMK: (3) 2-2-47:59, 67, 68 and 71.

Aloha e Kim Evans,

The Office of Hawaiian Affairs (OHA) is in receipt of the above-mentioned letter dated August 21, 2008. The Department of Hawaiian Home Lands (DHHL) proposes to consolidate four parcels and then subdivide the resulting parcel into two lots. Lot 5-A-1, measuring 15.5 acres, would then be developed into a commercial mixed-use project. OHA has reviewed the project and offers the following comments.

The Environmental Assessment (EA) should include a Cultural Impact Assessment (CIA) in accordance with Chapter 343 of the Hawaii Revised Statues (HRS). The CIA should identify cultural resources, practices and beliefs associated with a project site; assess the impacts the project may have on these resources, practices and beliefs; and provide measures to mitigate those impacts.

OHA requests that a comprehensive archaeological inventory survey for the 15.5-acre project area be conducted and submitted to the Department of Land and Natural Resources – Historic Preservation Division for review and approval. OHA should be allowed the opportunity to comment on the criteria assigned to any cultural or archaeological sites identified within the archaeological inventory survey. Consideration must also be afforded to any individuals accessing the project area for constitutionally protected traditional and customary purposes, in accordance with the Hawai'i State Constitution, Article XII, section 7.

We request the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama 'āina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: OHA Hilo CRC Office

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

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AIA

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AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Clyde W. Nāmu'o, Administrator
State of Hawai'i
Office of Hawaiian Affairs
711 Kapi'olani Blvd., Suite 500
Honolulu, HI 96813

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Aloha e Mr. Nāmu'o,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 09, 2008. In response to your comments, we offer the following:

We want to assure you that a Cultural Impact Assessment (CIA) and an archaeological survey are being prepared for the subject property in accordance with Chapter 343 of the Hawai'i Revised Statutes. These studies will identify any potential impacts to cultural resources, practices, and beliefs associated with the project site along with accompanying mitigation strategies. The Office of Hawaiian Affairs (OHA) will be afforded an opportunity to comment on the criteria assigned to any cultural or archaeological sites identified in the archaeological survey.

Should any cultural access activities for traditional and customary activities come to light on the subject property, OHA will be contacted and individuals involved will be given due consideration in accordance with Hawai'i State Constitution, Article XII, section 7.

Additionally, if during construction any iwi kūpuna or Native Hawaiian cultural or traditional deposits are inadvertently discovered, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

The suggestion to utilize native vegetation in the landscape plan for the subject parcel is appreciated and will be relayed in the DEA as a recommendation to Safeway Inc. and Target Corp, the successful applicants for the long term lease for the subject parcel.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

Harry Kim
Mayor

Christopher J. Yuen
Director

Brad Kurokawa, ASLA LEED® AP
Deputy Director

County of Hawaii
PLANNING DEPARTMENT
101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720-4224
(808) 961-8288 • FAX (808) 961-8742

September 10, 2008

SEP 12 2008

Ms. Kim Evans
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

Dear Ms. Evans:

Subject: **Pre-Assessment Consultation for Draft Environmental Assessment**
Applicant: **Department of Hawaiian Home Lands (DHHL)**
Project: **DHHL**
TMK: **(3) 2-2-47:59 Lot 5-A-1 Waiakea, South Hilo; Hawai'i**

This is in response to your request for comments on the above-referenced project.

According to your submittal, the Department of Hawaiian Home Lands (DHHL) is seeking to enter into a general lease agreement for the construction, operation, and management of an industrial/commercial mixed-use development and related facilities on the 15.5 acre subject site.

We have the following to offer on the proposed project:

1. The State Land Use designation is Urban.
2. The County of Hawaii General Plan LUPAG designation is high-density urban.
3. The current County zoning designation is General Industrial with a minimum building site area requirement of 1,000 square feet (MG1). Additionally, your submittal indicates that the DHHL plans to designate the site for development under Industrial-Commercial Mixed District (MCX) guidelines for planning and permitting purposes which is allowed under section III (C) of the County of Hawaii/DHHL Memorandum of Agreement.

Hawai'i County is an Equal Opportunity Provider and Employer.

Based on the preceding information, the proposed industrial/commercial mixed-use is an appropriate use for the project site.

According to your submittal, you anticipate that this development will generate additional traffic on existing roadways. The County expects the DHHL to mitigate those traffic impacts like any other private developer, pursuant to section IV (F) of the County of Hawaii/DHHL Memorandum of Agreement, which reads:

"Should DHHL elect to convert its land to a more intensive land use, DHHL will be responsible for upgrading the onsite infrastructure to accommodate the new use, and will consult with the County regarding the need to upgrade offsite infrastructure. DHHL and the County shall negotiate the extent to which DHHL will be responsible for any such offsite improvements requested by the County. DHHL shall be responsible for project-related offsite improvements to the extent that these would be required of other developers with similar projects. If offsite improvements benefit other property, DHHL and the County shall cooperate so that DHHL bears only its fair share of these improvement costs."

Please provide this office with a copy of the draft EA upon its publication. Should you have questions, please contact Christian Kay of my staff at 961-8288 extension 254.

Sincerely,

CHRISTOPHER J. YUEN
Planning Director

CRK:cs
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cc: Mayor's Office
Department of Public Works

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

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AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Christopher Yuen, Director
County of Hawai'i
Planning Department
101 Pauahi Street, Suite 3
Hilo, HI 96720

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Mr. Yuen,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 10, 2008. With regard to your comments, we offer the following responses:

We understand that the State Land Use designation is Urban and the County of Hawai'i General Plan LUPAG designation is high density urban. DHHL does indeed intend to designate the site for development under the Industrial-Commercial Mixed Use District (MCX) guidelines for planning and permitting purposes as allowed under section III (C) of the County of Hawai'i/ DHHL Memorandum of Agreement. As you note, this would be a change from the current County zoning designation General Industrial (MG1) with a minimum building site area requirement of 1,000 square feet.

Given the preceding information, we appreciate that the County Planning Department views the proposed industrial/ commercial mixed-use as an appropriate use for the project site.

We acknowledge the request to mitigate traffic impacts created by this development on existing roadways in the manner that any private developer would. We understand this request is pursuant to section IV (F) of the County of Hawai'i/ DHHL Memorandum of Agreement, as quoted in your comment letter. The DEA will include traffic engineering analysis including current and projected traffic flow levels and the appropriateness of the installation of a traffic control system or other traffic mitigation measures. We hope this meets the spirit of the aforementioned Memorandum of Agreement.

DHHL will upgrade the onsite infrastructure to accommodate the new use and will cooperate with the County regarding the need to upgrade offsite infrastructure to the extent that DHHL will bear its fair share of these improvement costs.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We

look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

Harry Kim
Mayor

Bobby Jean Leithead Todd
Director

Nelson Ho
Deputy Director

County of Hawai'i
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai'i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

August 29, 2008

SEP - 3 2008

Kim Evans, Planner
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, HI 96813-4307

Re: Pre-Assessment Consultation for Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Property
Waiakea, South Hilo
TMK: 2-2-47:59 Lot 5-A-1

Please find enclosed comments from our Wastewater Division relating to the subject project.

Thank you for allowing us to review and comment on this Draft EA.

Sincerely,

Bobby Jean Leithead Todd
DIRECTOR

enclosure

cc: Dora Beck, WWD Chief

11088 A

County of Hawai'i is an Equal Opportunity Provider and Employer.

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
WASTEWATER DIVISION
COUNTY OF HAWAII – 108 RAILROAD AVENUE – HILO, HI 96720
HILO (808) 961-8338 FAX (808) 961-8644

MEMORANDUM

August 28, 2008

To: Bobby Jean Leithead Todd, Director

From: Dora Beck, P.E., Wastewater Division Chief DB

Subject: Pre-Assessment Consultation for Draft Environmental Assessment DHHL East Maka`ala and Railroad Avenue, TMK 2-2-047:059

The Wastewater Division has reviewed the above-named document dated August 21, 2008 and provides the following comments.

Page 1-5, Utilities

1. Sewer service is provided by the County of Hawai`i Department of Environmental Management.

2. The existing sewer line on Maka`ala Street fronting the subject property is an 8-inch sewer extension installed by Home Depot (TMK 2-2-047:064) during construction of their building. The sewer extension currently serves Home Depot and Panda Express (TMK 2-2-047:076).
   - A sewer study in accordance with the Design Standards of the Department of Wastewater Management, City and County of Honolulu is required to be performed to verify capacity of the existing system.
   - The sewer capacity study shall evaluate the existing sewer collection system from the intended connection point for the subject property to where the 36-inch sewer line begins on Leilani Street.

Should there be any comments or questions on the above, please contact Lyle Hirota at 808-961-8333 (lhirota@co.hawaii.hi.us) or you may contact me at 808-961-8513 (dbeck@co.hawaii.hi.us).

cc: L. Hirota
A. Nakatani, EST III

Hawai`i County is an equal opportunity provider and employer.

GROUP 70 INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

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AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Dora Beck, P.E., Wastewater Division Chief
County of Hawai'i
Department of Environmental Management
Wastewater Division
108 Railroad Avenue
Hilo, HI 96720

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Ms. Beck,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated August 21, 2008. In response to your comments, we offer the following:

We understand that sewer service to the subject property is provided by the County of Hawai'i Department of Environmental Management. W are also aware that the existing sewer line on Maka'ala is an 8-inch sewer extension installed by Home Depot (TMK 2-2-047:064) which presently serves both Home Depot and Panda Express (TMK 2-2047:076).

A sewer study which includes evaluation of the existing sewer collection system from the intended connection point for the subject property to the 36-inch sewer line point of origin on Leilani Street will be prepared. This study will verify the capacity of the existing system and will be conducted in accordance with the Design Standards of the Department of Wastewater Management, City and County of Honolulu.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans

Kim Evans
Planner

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

September 11, 2008

SEP 16 2008

Ms. Kim Evans
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
DHHL EAST MAKAALA MIXED USE PROPERTY
TAX MAP KEY 2-2-047:059 (LOT 5-A-1)

We have reviewed the subject Pre-Environmental Assessment Consultation and have the following comments.

Water is available from an existing 12-inch waterline within Railroad Avenue and an existing 8-inch waterline within Makaala Street, both fronting the subject parcel. Please be informed that there are several existing service laterals installed to the parcel along Makaala Street and Railroad. The Department will request construction plans showing the location and size of the service laterals fronting the parcel and the location of any new service laterals to be installed.

The Department will also request estimated maximum daily water usage calculations, prepared by a professional engineer licensed in the State of Hawai'i, for the water demand of any proposed projects within the parcel. Further, any meter(s) serving the subject parcel shall have a reduced pressure type backflow prevention assembly installed within five (5) feet of the meter on private property before water service can be activated.

Please also be informed that the existing 12-inch and 8-inch waterlines fronting the parcel are adequate to provide the required 2,000 gallons per minute fire-flow, as per the Department's Water System Standards for commercial or industrial land use applications.

Should there be any questions, you may contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

...Water brings progress...

The Department of Water Supply is an Equal Opportunity provider and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410. Or call (202) 720-5964 (voice and TDD)

GROUP 70 INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
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AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Milton D. Pavao, P.E., Manager
County of Hawai'i
Department of Water Supply
345 Kekūanaō'a Street, Suite 20
Hilo, HI 96720

Subject: Pre- Assessment Consultation for Draft Environmental Assessment
DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Mr. Pavao,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 11, 2008. In response, we offer the following:

We appreciate your confirmation of water availability to the subject property from existing waterlines fronting the property: a 12-inch waterline within Railroad Avenue and an 8-inch waterline within Maka'ala Street. We are indeed aware that there are several existing service laterals on both streets.

Construction plans depicting the location and size of the service laterals fronting the parcel and the location of any new service laterals to be installed will be made available to the Department of Water Supply (DWS) for review. Estimated maximum daily water usage calculations prepared by Masahiro Nishida, a professional engineer licensed in the State of Hawai'i, will also be provided to DWS.

We note that any meter(s) serving the subject parcel must have a reduced pressure type backflow prevention assembly installed within 5 feet of the meter on private property before water service to the site will be activated.

We assure you fire protection requirements will be coordinated with the County of Hawai'i Fire Department. We appreciate the assurance that the existing 12-inch and 8-inch waterlines mentioned above are adequate to provide the required 2,000 gallons per minute fire-flow, as per the DWS Water System Standards for commercial or industrial land use.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL, INC.

Kim Evans
Planner

Harry Kim
Mayor

Darryl J. Oliveira
Fire Chief

Glen P.I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

August 31, 2008

Kim Evans, Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
PROJECT: EAST MAKA'ALA AND RAILROAD AVENUE
HILO, HAWAII

In regards to the above-mentioned draft environmental assessment, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"Fire Apparatus Access Roads

"**Sec. 10.207.** (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

DARRYL OLIVEIRA
Fire Chief

JCP:lpc

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Darryl Oliveira, Fire Chief
County of Hawai'i
Fire Department
25 Aupuni Street, Suite 103
Hilo, HI 96720

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Chief Oliveira,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated August 31, 2008. In response to your comments, we offer the following:

To ensure safety and access in the event of a fire, provisions have been made for the construction of a fire apparatus access road in compliance with the Uniform Fire Code (UFC) requirements referenced from Section 10.207.

Additionally, an approved water supply (including on-site fire hydrants and mains, as required) capable of supplying the required fire flow for fire protection will be provided, as pursuant to the UFC Section 10.301 (c), as referenced in your comment letter.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

Harry Kim
Mayor

Lawrence K. Mahuna
Police Chief

Harry S. Kubojiri
Deputy Police Chief

County of Hawaii
POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawai'i 96720-3998
(808) 935-3311 • Fax (808) 961-8865

SEP 10 2008

September 5, 2008

Ms. Kim Evans, Planner
Group 70 International, Inc.
925 Bethal Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Evans:

Re: Pre-Assessment Consultation for Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Property
TMK (3) 2-2-47:59 Lot 5-A-1
Waiakea, South Hilo, Hawaii

Staff, upon reviewing the provided documents and visiting the proposed site, comments as follows.

The proposed project could significantly impact traffic levels on both Railroad Avenue and Maka'ala Street. Any significant increases to present traffic levels on Maka'ala Street may negatively impact traffic safety, potentially leading to an increase in the incidence of traffic casualties on Maka'ala Street. Of greatest concern is the impact increased traffic levels will have at the intersection, providing vehicular access into Prince Kuhio Plaza and Border's Books at the west end of Maka'ala Street. Present traffic levels in this area already make left turn movements to either enter or exit these businesses difficult and hazardous.

It is our view that installation of a traffic control system or other traffic mitigation measure be considered for this intersection, prior to this project's approval.

Thank you for allowing us the opportunity to comment.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

KV:lli

"Hawai'i County is an Equal Opportunity Provider and Employer"

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Derek D. Pacheco, Assistant Police Chief
Area I Operations Bureau
County of Hawai'i
Police Department
349 Kapiolani Street
Hilo, HI 96720

Subject: Pre- Assessment Consultation for Draft Environmental Assessment
DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:072

Dear Mr. Pacheco,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 5, 2008. In response, we offer the following:

We recognize your concern regarding the proposed development's potential impact on traffic levels on Railroad Avenue and East Maka'ala Street, especially at the intersection, because of the additional vehicular access points to Prince Kuhio Plaza and Border's Books at the west end of Maka'ala Street. We understand that left turn movements to either enter or exit these businesses are already difficult due to present traffic levels in the area. We do not wish to exacerbate any existing traffic congestion.

The DEA will include traffic engineering analysis of these issues including current and projected traffic flow levels and the appropriateness of the installation of a traffic control system or other traffic mitigation measures for the intersection.

We hope this addresses your concerns and appreciate your participation in the environmental review process. Your comment letter and this response will be included in the DEA, and we will send you a copy of the DEA for your review. We look forward to any further comments you may have. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

Kim Evans

From: Avis [avis_yoshioka@yahoo.com]
Sent: Friday, September 12, 2008 3:50 PM
To: EastMakaalaEA
Subject: Pre-Assessment Consultation

Aloha,
Because our address is currently in transition to our P.O Box we did not have enough time to view and discuss this EA. We are requesting that any development being done in our community be stipulated to give community fair share because it is directly affecting our community.
Any other communication you want us to see please send to:

Panaewa Hawaiian Home Lands Community Association
P.O Box 4326
Hilo, HI 96720-0326

Mahalo,
Avis Yoshioka
President

GROUP 70 INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

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AIA

George I. Atta
AICP

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AIA, LEED AP

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AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

December 23, 2008

Avis Yoshioka, President
Panaewa Hawaiian Home Lands Community Association
P.O.Box 4326
Hilo, HI 96720-0326

Subject: Pre- Assessment Consultation for Draft Environmental Assessment DHHL East Maka'ala and Railroad Avenue, TMK 2-2-047:059

Dear Mr. Yoshioka,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated September 12, 2008. In response to your comments, we offer the following:

We regret your difficulty with reviewing the pre-assessment document regarding the Draft Environmental Assessment (DEA) during your transition of address to a P.O. Box. To clarify, the DEA is being drafted at this time, and there should be adequate time for you to review and comment upon it after its publication.

We appreciate the spirit of your request that any development in your community be required to give to the community in a way that balances any impacts to the community. Measures that will mitigate any expected impacts to the community or surrounding environment will be a part of the DEA.

Thank you for taking the time to share your comments with us. Your comment letter and this response will be included in the Final EA. We will send you a copy of the DEA for your review, and we look forward to your comments. If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,
GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

DRAFT ENVIRONMENTAL ASSESSMENT COMMENT LETTERS AND RESPONSES

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
BRIAN H. SEKIGUCHI
JIRO A. SUMADA

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

DIR 0017
STP 8.3121

February 6, 2009

Ms. Kim Evans
Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Ms. Evans:

Subject: Department of Hawaiian Home Lands (DHHL)
East Makaala Mixed Use Development
Draft Environmental Assessment (DEA)

Thank you for providing the subject document for review and comments.

The State Department of Transportation (DOT) understands that the subject DEA addresses a proposed project involving a DHHL joint lease agreement with Target Corporation and Safeway Inc. for the construction, operation and management of an industrial/commercial mixed-use development on 15.574 acres of Hawaiian Home Lands located at the corner of East Makaala Street and Railroad Avenue in Hilo. The project proposes construction of a total of 220,000 square feet (SF) of space consisting of a 160,000 SF general merchandise store (Target) and a 60,000 SF grocery supermarket (Safeway) with approximately 712 parking stalls. Access to the project will be from both Railroad Avenue and East Makaala Street with an additional service vehicle lane on Railroad Avenue.

The subject project will impact State highway facilities by its contribution of traffic to Kanoelehua Avenue and East Puainako Street.

The November 2008 Traffic Impact Analysis Report (TIAR) that was prepared for the DEA should be revised to address the following concerns and resubmitted for DOT Highways Division's review and acceptance. The comments regarding the TIAR are:

1. The TIAR should identify the proposed phasing of the development and the timing of the specific improvements recommended with each phase. A development plan of the subject project should accompany the TIAR.

2. The TIAR should include recommendations to address the existing infrastructure deficiencies and to provide appropriate, recommended, mitigation measures.

3. The TIAR should include the impacts on the existing intersection of Makaala Street and Kanoelehua Avenue, with an emphasis on addressing the additional congestion issues that will occur due to the proposed commercial/industrial areas. Further, a study should be conducted on access management for Makaala Street between Railroad Avenue and Kanoelehua Avenue to address congestion.

4. Increasing the traffic signal cycle is not an acceptable mitigation measure for project-generated impacts. The TIAR should be revised to include more appropriate mitigation measures.

5. The TIAR should include an analysis of the East Puainako Street/Pilipaa Street/Prince Kuhio Plaza (Blockbuster) driveway in conjunction with the proposed dual left-turn lane and through lanes at the East Puainako Street/Kanoelehua Avenue intersection.

6. The TIAR should also address the impact of the proposed project driveways on intersections along Kanoelehua Avenue due to their close proximity.

7. DHHL should also implement other improvements required to mitigate the traffic impacts of past developments including:

    a. Puainako Street to Makaala Street through traffic lane.
    b. Makaala Street to Pohaku Street auxiliary lanes.
    c. Kanoelehua Avenue double left-turn lanes into Makaala Street improved to current standards.
    d. Kanoelehua Avenue sidewalk along the frontage from Puaainako Street to Pohaku Street.

8. The TIAR should include traffic signal warrant analysis as this is part of the recommended mitigation measures.

For the TIAR, DOT requests that DHHL ask the project's consultant to address the above comments and initiate coordination with the Highways Division Planning Branch at (808) 587-1830.

DOT appreciates the opportunity to provide these initial comments and will defer additional comments until after reviewing the revised TIAR. DOT requests four (4) copies of the revised TIAR and any other additional environmental documents prepared for this project be provided. If there are

any other questions, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, PH.D., P.E.
Director of Transportation

SP:km

c: Katherine Kealoha, Office of Environmental Quality Control
Peter "Kahana" Albinio, Department of Hawaiian Home Lands

bc: HWY, HWY-P, -H, STP(SP)

GROUP 70 INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
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AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Brennon T. Morioka, Ph.D., P.E.
Director of Transportation
State of Hawaii Department of Transportation
869 Punchbowl Street, Rm 404
Honolulu, HI 96813

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Director Morioka,

Thank you for your comment letter dated February 06, 2009, for the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We note that DOT's assessment is that the proposed project will impact State highway facilities by its contribution of traffic to Kanoelehua Avenue and East Pū'ainakō Street.

Several concerns were raised regarding the potential traffic impacts related to the proposed development at East Maka'ala and Railroad Avenue in Hilo. Specifically, there is a request for a revised TIAR relating to the proposed project.

We met with the DOT engineers who compiled these comments to get a better understanding of these concerns. We also met with Austin, Tsutsumi and Associates, the traffic sub- consultant to the project design engineer Richard Sato and Associates for the proposed developer, to address the concerns raised by your staff. We have incorporated DOT's concerns and addressed them with mitigation recommendations in a revised TIAR.

Before responding to your specific concerns, we want to let you know about changes to the project proposal. At the time of preparation of the Traffic Impact Analysis Report (TIAR) for the Draft Environmental Assessment, the proposed project was smaller than current plans provide for, which may account for some of the discrepancies in mitigation measures and projected impacts. The proposed Target store size has increased from 120,000 to 160,000 square feet (sf), but the Safeway remains 60,000 sf. This represents a 22% increase in area.

This area increase will result in the following traffic flow increases:

- 11% increase during morning peak traffic flow,
- 16% increase in the afternoon peak traffic flow, and
- 19% increase on weekends.

Tables and figures reflecting this updated trip generation, distribution and assignment analyses are included on the attached *Table 1 Trip Generation and Distribution Analysis*; *Figures 8A, 8B, and 8C Project Generated Trip Assignment*; and

Figures 9A, 9B, and 9C 2013 Total with Project Forecast. A revised TIAR will be submitted to DOT and will be included in the Final EA to address these changes as well as responses to your State Department of Transportation (DOT) concerns as explained below:

1. **TIAR Should Identify Proposed Phasing of Development and Include a Development Plan**

Development and phasing plans for the proposed project will be available in the design phase. The development will likely be divided into two phases by first building the Target store and then Safeway, with the site work for both combined into the first phase. The proposed developers will work with DOT through the design phase to evaluate implementation of the proposed improvements.

2. Include Recommendations to Address Existing Infrastructure Deficiencies and Provide Appropriate Mitigation Recommendations

The TIAR as written addresses what we believe to be infrastructure deficiencies relevant to the proposed project, but in general does not address regional deficiencies related to other developments, past or proposed. Results of level of service (LOS) analyses to addresses existing infrastructure deficiencies are shown on *Table 2 Signalized Intersection Level of Service Analysis*. These studies showed the impacts of the following mitigation measures:

a) a third northbound lane on Kanoelehua Avenue, and
b) a double left turn lanes on Pū'ainakō Street at Kanoelehua Avenue.

As explained below, there remain some concerns at these intersections that need to be addressed by regional traffic planners.

A third northbound lane on Kanoelehua Avenue is necessary to improve traffic operations at Pū'ainakō Street and Maka'ala Street intersections during the morning and weekend peak traffic flows. The additional lane does not address impacts during the afternoon peak flow because it is in the opposite direction. During the morning and weekend peak periods, that lane would allow a decrease in the "green time" for through traffic by giving additional "green time" to side street traffic, thereby improving side street operations and overall intersection operations.

DHHL believes the third lane on Kanoelehua mitigates a regional problem that does not solely result from the proposed development. Rather, the proposed development contributes to an existing situation. DHHL will cooperate with the State and County regarding the need to upgrade traffic infrastructure to the extent that DHHL bears its fair share of these improvement costs. Calculating the fair cost share will be an item of continued discussion.

At Pū'ainakō Street, the third northbound lane on Kanoelehua would improve overall intersection LOS from D to C during the morning peak and from E to D on Saturdays. Because of directional flows, delays would decrease only for northbound traffic on Kanoelehua Avenue; this lane does not improve afternoon peak LOS from D because it does not address southbound traffic. Several approaches and movements would continue to operate at level of service E during the afternoon and Saturday peak hours.

At the Maka'ala Street intersection, the lane would improve overall intersection LOS from D to C during the morning peak, but LOS would remain at level of service D during afternoon and weekend peak periods, though the lane would help decrease waiting periods at this intersection.

The double left turn lanes on Pū'ainakō Street at Kanoelehua Avenue would improve overall intersection levels of service in the morning and Saturday peak periods at the Pū'ainakō Street intersection. These lanes would decrease delays during the afternoon peak traffic flow, and LOS here would not be impacted. Several approaches and movements would continue to operate at level of service E during the Saturday peak period. Congestion in the single through lane on the eastbound approach of Pū'ainakō Street during the afternoon and Saturday peak periods remains heavy and may require further mitigation. Widening the eastbound through movement from one to two lanes would improve traffic operations.

3. TIAR Should Include Impacts on Maka'ala Street and Kanoelehua Avenue Intersection and Analysis of Access Management on Maka'ala

The TIAR identifies the traffic impacts on the existing Kanoelehua Avenue/Maka'ala Street intersection and the additional congestion issues from the proposed project along Maka'ala Street and Pū'ainakō Street. *Tables 3 Signalized Intersection Level of Service Analysis* and *5 Unsignalized Intersection Level of Service Analysis* summarize LOS analysis for the intersections along Maka'ala Street and Pū'ainakō Street from Kanoelehua Avenue to Railroad Avenue, for existing traffic, 2013 ambient traffic, and 2013 total traffic flows. These LOS analyses include traffic impacts resulting from the proposed project in terms of the existing roadway design and represent studies of access management for Maka'ala Street between Railroad Avenue and Kanoelehua Avenue.

The results of these studies indicate that mitigating measures are required along both roadways as indicated by levels of service E and F for key traffic movements.

The proposed mitigating measures are:

<u>Pū'ainakō Street:</u>

a) Major improvements are necessary at the Kanoelehua Street intersection and are discussed in items 2, 5 and 7 of this letter.
b) A four-way stop at Ohuohu Street.

Maka'ala Street:

c) The third northbound lane from the Pū'ainakō Street intersection would continue through the intersection.
d) Rechannel and install traffic signals at the two existing Waiākea Center driveways. The west (mauka) driveway could be redesigned to permit only inbound left turns and outbound right turns. The east (makai) driveway could be redesigned for outbound left, through, and inbound right turn movements.. These changes would allow a two phase traffic signal operation with short cycle lengths to promote easier traffic flows.
e) All-way stop or traffic signals at Ohuohu Street.

Pohaku Street

f) Terminate the third northbound lane on Kanoelehua Avenue as a right turn only lane into Pohaku Street.
g) The need for and impact of traffic signals should be studied at the Kanoelehua intersection; traffic volumes probably warrant traffic signals. The west bound left turn movement from Pohaku Street should be eliminated if the intersection remains unsignalized. If signalized, outbound left turns from Pohaku Street should be banned to permit a two phase signal operation that would maximize the "green time" for inbound left turns from Kanoelehua Avenue.
h) Improve Kukila Street to accommodate higher traffic volumes by widening the roadway to a 24 ft minimum and control access along Kukila Street.

Austin Tsutsumi and Associates, the traffic sub-consultant to the project design engineer, will address access management/congestion concerns on Maka'ala Street.

4. **Appropriateness of Increasing Traffic Signal Length as a Mitigation Measure**

We recommended increases in traffic signal cycle lengths, as is often practice in traffic engineering, to accommodate increases in ambient traffic growth and the increases in PM peak hour project-generated traffic. We have included several mitigating measures in place of increased cycle lengths in the revisions detailed in this letter and the revised TIAR.

5. **Analyze East Pū'ainakō Street/Pilipa'a Street/Prince Kūhiō Plaza Driveway in Conjunction with the Proposed Dual Left-Turn Lane and Through Lanes at the East Pū'ainakō Street/Kanoelehua Avenue Intersection**

The "typical" traffic engineering mitigation for the East Pū'ainakō Street/Pilipa'a Street/Prince Kūhiō Plaza driveway problem would be to convert it into a right turn in, right turn out driveway. This solution would eliminate the currently problematic inbound left turn movement from Pū'ainakō Street that extends

beyond the left turn lane and blocks eastbound through traffic. We feel this mitigation measure will be necessary when the roadways are widened, but it may not be acceptable to several parties and will require agency negotiation with landowners. Under this measure, the Pilipa'a Street approach would remain in its present design, although it may lose several feet.

6. **Impact of Proposed Driveways on Intersections along Kanoelehua Avenue**

We understand DOT's concern that eastbound traffic on Pū'ainakō and Maka'ala Streets turning into the retail center driveways could cause traffic backups to Kanoelehua Avenue. We have proposed mitigating measures in points 3 and 5 above to deal with this concern.

7. **Mitigation of Impacts from Past Developments**

DOT's request that DHHL mitigate traffic impacts from past developments is beyond the scope of the requirements for the EA for this proposed project. However, we have some responses to the specific concerns expressed:

a) Pū'ainakō Street to Maka'ala Street Through Traffic Lane: Our analysis of several mitigating measures at the two signalized intersections with the future project generated traffic is summarized on *Table 4, Signalized Intersection Level of Service Analysis with Mitigation*. A third northbound lane would not in itself provide level of service D or better conditions at the Pū'ainakō Street intersection, nor would double left turn lanes on the two Pū'ainakō Street approaches. A combination of mitigating measures including a third northbound lane on Kanoelehua Avenue, double left turns on both approaches of Pū'ainakō Street, and a second eastbound through lane on Pū'ainakō Street, would be required to provide level of service D or better operations in all three study periods. A third northbound lane would provide level of service D or better conditions at the Maka'ala Street intersection.

   The DOT is planning for the future widening of Kanoelehua Avenue to six lanes including sidewalks and a bikeway on the east side of the street by not allowing adjoining land owners to build within the future rights of way for both the bikeway and the road. This suggested additional lane improvement would be part of the DOT's future street widening project. However, there may not be sufficient right of way to permit all these improvements.

b) Kanoelehua Avenue, Maka'ala Street to Pohaku Street Auxilary Lanes: A third northbound lane is recommended from Pū'ainakō Street to Pohaku Street to increase Kanoelehua Avenue's capacity. This lane would terminate as a right turn only lane at Pohaku Street. The additional lane in combination with other improvements discussed below would require additional right of way set asides.

c) Kanoelehua Avenue Double Left-Turn Lanes into Maka'ala Street: The median separating the left turn lanes from the northbound lanes at Maka'ala Street and at Pohaku Street are substandard. To address this traffic safety concern by widening the median to standard width and adding a third northbound lane, a minimum of 16 feet additional right of way and shifting the northbound travel lane alignment to accommodate the wider median will be required.

d) Kanoelehua Avenue Sidewalk along the frontage from Pū'ainakō Street to Pohaku Street: There were very few pedestrians observed on Kanoelehua Avenue, so providing a sidewalk along the frontage from Pū'ainakō Street to Pohaku Street may not be necessary. On the other hand, few pedestrians may be present because there is no sidewalk. Providing sidewalks would increase the highway right of way requirements by approximately 10 ft and may increase pedestrian traffic. We suggest DOT study this issue further to inform its plans for widening Kaneolehua Avenue.

8. **Traffic Signal Warrant Analysis**

Traffic signal warrant analyses are normally done at the design stage. The project design engineer will conduct warrant analyses for the Ohuohu Street and Railroad Avenue intersections on Maka'ala Street. We conducted a preliminary traffic signal warrant analysis with the 6 hours of weekday traffic data available and determined that traffic signals are probably warranted at these intersections. To complete the analysis, the design engineer will need to collect additional traffic data to complete traffic signal warrant studies. They will also need to conduct a more detailed analysis of the existing center driveways on Maka'ala Street and the Pū'ainakō Street/Ohuohu Street intersection to determine appropriate mitigation measures.

Thank you for your review and participation in the environmental review process. Your comment letter and the corresponding response will be included in the Final EA, and we will send you a copy of the FEA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner
Attachments
cc: DHHL, OEQC

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Morning Peak Hour	Enter	Exit	Direction of Travel	Total # of Trips	North %	North No.	West %	West No.	South %	South No.	East %	East No.	Internal %	Internal No.
160 KSF Free Standing Discount Store														
	66%	32%												
T= 0.84(160)														
T= 134	89	43												
60 KSF Supermarket														
	61%	39%												
T= 3.25(60)														
T= 195	119	76												
Combined														
T= 327	208	119												
Less Multi-use Trips (15%)	-21	-21	Enter	187	27%	50	19%	35	25%	47	18%	34	10%	19
T= 285	187	98	Exit	98	33%	33	23%	22	18%	18	16%	16	10%	10
Pass-by Trips (30%)			Enter	50		15		11		14		10		
			Exit	50		25				15		10		
Directly generated trips			Enter	137		35		25		33		24		
			Exit	48		8		22		3		6		

TABLE 1 (continued)
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Afternoon Peak Hour	**Enter**	**Exit**	**Direction of Travel**	**Total # of Trips**	**North**		**West**		**South**		**East**		**Internal**	
					%	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**
160 KSF Free Standing Discount Store														
	50%	50%												
T= 5.06(160)														
T= 810	405	405												
60 KSF Supermarket														
	51%	49%												
T= 10.45(60)														
T= 627	320	307												
Combined														
T= 1437	725	712												
Less Multi-use Trips (15%)	-109	-109	Enter	616	36%	222	22%	133	17%	105	15%	94	10%	62
T= 1219	616	603	Exit	603	28%	168	23%	136	31%	185	9%	54	10%	60
Pass-by Trips (30%)			Enter	166		67		40		32		28		
			Exit	167		72				67		28		
Directly generated trips			Enter	450		155		93		74		66		
			Exit	436		96		136		118		26		

TABLE 1 (continued)
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Saturday Mid-day Peak	**Enter**	**Exit**	**Direction of Travel**	**Total # of Trips**	**North**		**West**		**South**		**East**		**Internal**	
					%	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**
160 KSF Free Standing Discount Store														
	51%	49%												
T= 7.58(160)														
T= 1213	619	594												
60 KSF Supermarket														
	51%	49%												
T= 10.76(60)														
T= 646	329	316												
Combined														
T= 1858	948	911												
Less Multi-use Trips (15%)	-142	-142	Enter	806	35%	283	17%	138	25%	203	13%	102	10%	81
T= 1574	806	768	Exit	768	36%	277	17%	131	26%	201	11%	83	10%	77
Pass-by Trips (30%)			Enter	218		85		41		61		30		
			Exit	217		102				85		30		
Directly generated trips			Enter	588		198		96		142		71		
			Exit	551		175		131		116		53		

TABLE 2
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing Conditions with Mitigation Measures)

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		w/3 NB Lanes		w/2 LT Lanes		EXISTING		w/3 NB Lanes		w/2 LT Lanes		EXISTING		w/3 NB Lanes		w/2 LT Lanes	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																		
OVERALL	D	41.2	C	33	C	34.5	D	48.6	D	46.5	D	40.5	E	56.7	D	54.7	D	52.2
E. Puainako St EB	E	74.8	D	45.8	D	36	E	79.6	E	79.6	D	44.4	E	68.3	E	65	E	56.2
Left Turn Lane	F	100	D	53.5	D	37.6	F	91.5	F	91.5	D	46.6	E	71.7	E	63.9	D	51.9
Through Lanes	C	33.5	C	33.5	C	33.5	E	70.6	E	70.6	D	42.7	E	65.8	E	65.8	E	59.1
E. Puainako St WB	D	48.3	D	42.4	D	42.7	D	45.8	D	45.8	C	31.4	E	58.4	D	54.2	D	46.9
Left Turn Lane	E	57.9	D	42	D	42.8	E	65.8	E	65.8	D	38.9	E	76	E	66.6	D	52.2
Through Lanes	D	42.6	D	42.6	D	42.6	C	27.7	C	27.7	C	24.6	D	44.5	D	44.5	D	42.7
Kanoelehua Ave NB	C	34.3	C	28.1	C	34.3	D	45.2	D	36.6	D	45.4	E	57.3	D	54.5	E	57.6
Left Turn Lane	D	40.6	D	40.6	D	40.6	D	43.1	D	43.1	D	43.1	E	69.7	E	69.7	E	69.7
Through Lanes	C	34	C	23.9	C	34	D	49.4	C	34.4	D	49.4	E	66	D	51	E	66
Kanoelehua Ave SB	C	29.1	C	32.3	C	29.1	D	39.7	D	39.7	D	39.7	D	46.3	D	47.8	D	46.3
Left Turn Lane	D	43.2	D	43.2	D	43.2	D	45.2	D	45.2	D	45.2	E	75.1	E	75.1	E	75.1
Through Lanes	C	28.1	C	31.5	C	28.1	D	39.1	D	39.1	D	39.1	D	40.8	D	42.5	D	40.8
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																		
OVERALL	D	35.6	C	29.4			D	49.6	D	42.8			D	43.7	D	39.5		
E. Makaala St EB	C	33.2	C	34			C	34.4	C	34.4			D	45.2	D	41.7		
E. Makaala St WB	D	39.1	D	39.1			D	51.1	D	51.1			D	48.0	D	43.5		
Kanoelehua Ave NB	C	33.9	C	24.1			E	65.8	D	39.9			D	51.2	D	43.4		
Left Turn Lane	C	33.7	D	40			D	48.8	D	48.8			E	64.0	E	58.7		
Through Lanes	D	37.3	C	21.2			E	73.8	D	38.8			D	52.4	D	41.5		
Kanoelehua Ave SB	C	38.5	D	35.2			D	42.8	D	42.8			C	33.7	C	33.6		
Left Turn Lane	D	46.6	D	46.6			D	51.1	D	51.1			D	45.5	D	42		
Through Lanes	D	36.6	C	32.4			D	40.1	D	40.1			C	26.5	C	28.5		

TABLE 3
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																		
OVERALL	D	41.2	D	47	D	47.5	D	48.6	D	52.8	F	82.4	E	56.7	E	60.4	F	91.4
E. Puainako St EB	E	74.8	E	58.4	E	57.2	E	79.6	E	73.6	F	92.6	E	68.3	E	76.6	F	>100
Left Turn Lane	F	100	E	72.3	E	69.3	F	91.5	E	71.9	F	>100	E	71.7	E	70.1	F	>100
Through Lanes	C	33.5	D	36.7	D	38.6	E	70.6	E	76.2	E	76.5	E	65.8	F	81.7	F	>100
E. Puainako St WB	D	48.3	D	46.2	D	48.4	D	45.8	D	53.5	F	96.2	E	58.4	E	58.1	F	91.9
Left Turn Lane	E	57.9	D	46.6	D	46.1	E	65.8	E	74.7	F	>100	E	76	E	74.9	F	>100
Through Lanes	D	42.6	D	46.1	D	50	C	27.7	C	34.7	C	34.9	D	44.5	D	44.8	D	39.3
Kanoelehua Ave NB	C	34.3	D	48.5	D	49.2	D	45.2	D	52.5	F	85.1	E	57.3	E	64.3	F	86.4
Left Turn Lane	D	40.6	D	46.3	D	46.3	D	43.1	D	52.8	E	60.2	E	69.7	E	67.4	E	68.1
Through Lanes	C	34	D	51.8	D	53.5	D	49.4	E	56.6	F	>100	E	66	E	77.5	F	>100
Kanoelehua Ave SB	C	29.1	C	31	C	31	D	39.7	D	44	E	67.3	D	46.3	D	45.6	D	46.5
Left Turn Lane	D	43.2	D	45.8	D	45.8	D	45.2	D	51.1	E	56.4	E	75.1	E	73.4	E	74.6
Through Lanes	C	28.1	C	30	C	30.1	D	39.1	D	43.4	E	67.9	D	40.8	D	40.2	D	42.2
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																		
OVERALL	D	35.6	D	41.2	D	39.4	D	49.6	D	49.1	D	57.1	D	43.7	D	45.4	E	60.1
E. Makaala St EB	C	33.2	C	34.7	D	35.8	C	34.4	D	46.2	D	52.7	D	45.2	D	48.2	D	52.0
E. Makaala St WB	D	39.1	D	35.1	D	35.9	D	51.1	D	52.4	E	73.6	D	48.0	D	52.9	F	80.1
Kanoelehua Ave NB	C	33.9	D	43.7	D	39.6	E	65.8	D	52.3	D	48.8	D	51.2	D	51.4	D	45
Left Turn Lane	C	33.7	D	37.8	D	37.8	D	48.8	E	55.6	E	66.5	E	64.0	E	70.3	E	69.2
Through Lanes	D	37.3	D	49.2	D	45	E	73.8	D	54.2	E	58.8	D	52.4	D	52.2	E	56.5
Kanoelehua Ave SB	D	38.5	D	39.5	D	41.6	D	42.8	D	46.3	D	53.4	C	33.7	C	34.5	E	58.6
Left Turn Lanes	D	46.6	D	51	E	57.1	D	51.1	E	62	F	84.4	D	45.5	D	48.3	F	86.6
Through Lanes	D	36.6	D	36.1	D	35.8	D	40.1	D	41.2	D	39.9	C	26.5	C	26	C	30.7

TABLE 3 (CONTINUED)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR			SATURDAY PEAK HOUR		
	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL
APPROACH	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY
KANOELEHUA AVENUE/EAST POHAKU STREET INTERSECTION									
OVERALL			B 11.9			B 12.5			C 27.4
Pohaku St WB Right			C 33.9			C 34.2			D 42.5
Kanoelehua Ave NB			B 11.4			B 15.4			D 36.2
Kanoelehua Ave SB			A 10			A 8.4			B 15.9
Left Turn Lanes			D 39.7			D 41.9			D 44.3
Through Lanes			A 0.2			A 0.4			A 0.1
EAST MAKAALA STREET/WALMART EAST DRIVEWAY									N/A
OVERALL			A 7.2			A 8.4			
Makaala St EB			A 5.8			A 6.6			
Makaala St WB			A 6			A 6.8			
Prince Kuhio East DW NB			B 18.4			B 17.5			
Left Turn Lane			B 14.1			B 14.6			
Through Lane			C 26.2			C 26.5			
Walmart East DW SB			B 16.7			B 18.3			
Left Turn Lane			B 14.6			B 15.2			
Through Lane			C 26.4			C 27.2			

TABLE 3 (CONTINUED)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR			SATURDAY PEAK HOUR		
	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL
APPROACH	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY
EAST MAKAALA STREET/WALMART WEST DRIVEWAY									
OVERALL			B 12.1			B 13.6			N/A
Makaala St EB			B 13.2			B 13.7			
Left Turn Lane			B 19.4			C 23.6			
Though/Right lanes			A 7.6			A 9.3			
Makaala St WB			B 8			A 9.6			
Left Turn Lane			B 19.3			B 19.8			
Though/Right lanes			A 7.7			A 8.8			
Prince Kuhio East DW NB			B 19.5			C 20.3			
Walmart East DW SB			B 16.5			B 19.4			

TABLE 4
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Total with Project Forecast with Mitigation Measures)

INTERSECTION	MORNING PEAK HOUR								AFTERNOON PEAK HOUR								SATURDAY PEAK HOUR							
	NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT		NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT		NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																								
OVERALL	D	47.5	D	35.1	D	44	C	33.6	F	82.4	E	72.8	E	65.7	D	43.9	F	91.4	E	71.4	E	61.2	D	47.3
E. Puainako St EB	E	57.2	D	41.1	D	36.8	C	32.4	F	92.6	F	92.6	E	63.3	D	45.0	F	>100	F	>100	E	76.1	D	48.7
Left Turn Lane	E	69.3	D	42.7	D	35.7	C	31.2	F	>100	F	>100	D	47.4	D	41.7	F	>100	F	>100	E	75.9	D	55.0
Through Lanes	D	38.6	D	38.6	D	38.6	C	34.3	E	76.5	E	76.5	E	76.5	D	47.8	F	>100	F	>100	E	76.6	D	44.1
E. Puainako St WB	D	48.4	D	45.7	D	46.7	D	45	F	96.2	F	96.2	D	40.1	D	38.9	F	91.9	E	73.6	D	45.8	D	41.7
Left Turn Lane	D	46.1	D	38.6	D	41.3	D	36.9	F	>100	F	>100	D	45.3	D	39.3	F	>100	F	>100	E	57.2	D	47.3
Through Lanes	D	50	D	50	D	50	D	50	C	34.9	C	34.9	C	34.9	D	38.5	D	39.3	D	39.3	D	35.3	D	36.6
Kanoelehua Ave NB	D	49.2	C	31.7	D	49.2	C	31.7	F	85.1	D	50.3	F	85.1	D	43.4	F	86.4	D	51.5	E	71.9	D	49.6
Left Turn Lane	D	46.3	D	46.3	D	46.3	D	46.3	E	60.2	E	60.2	E	60.2	D	52.5	E	68.1	E	68.1	F	99.6	E	75.9
Through Lanes	D	53.5	C	29	D	53.5	C	29	F	>100	D	48.6	F	99.9	D	41.7	F	>100	E	57.4	F	83.4	D	53.1
Kanoelehua Ave SB	C	31	C	35	C	31	C	35	E	67.3	E	66.6	E	67.3	D	46.5	D	46.5	D	49	D	48.8	D	47.7
Left Turn Lane	D	45.8	D	45.8	D	45.8	D	45.8	E	56.4	D	56.4	E	56.4	D	48.5	E	74.6	E	74.6	F	>100	F	83.8
Through Lanes	C	30.1	C	34.5	C	30.1	C	34.5	E	67.9	D	67.9	E	67.9	D	46.3	D	42.2	D	45.2	D	39.4	D	42.2
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																								
OVERALL	D	39.4	C	29.3					D	57.1	D	50					E	60.1	D	52.1				
E. Makaala St EB	D	35.8	D	35.8					D	52.7	E	55.3					D	52.0	E	58.3				
E. Makaala St WB	D	35.9	D	35.9					E	73.6	E	58.9					F	80.1	E	57.4				
Kanoelehua Ave NB	D	39.6	C	22.7					D	48.8	D	43.2					D	45	D	42.5				
Left Turn Lane	D	37.8	D	37.8					E	66.5	E	72.8					E	69.2	E	76.8				
Through Lanes	D	45	C	22.6					E	58.8	D	48.8					E	56.5	D	50.8				
Kanoelehua Ave SB	D	41.6	D	41.6					D	53.4	D	47					E	58.6	D	54.6				
Left Turn Lanes	E	57.1	E	57.1					F	84.4	E	65.9					F	86.6	E	75.8				
Through Lanes	D	35.8	D	35.8					D	39.9	D	38.5					C	30.7	C	33.8				

TABLE 5
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

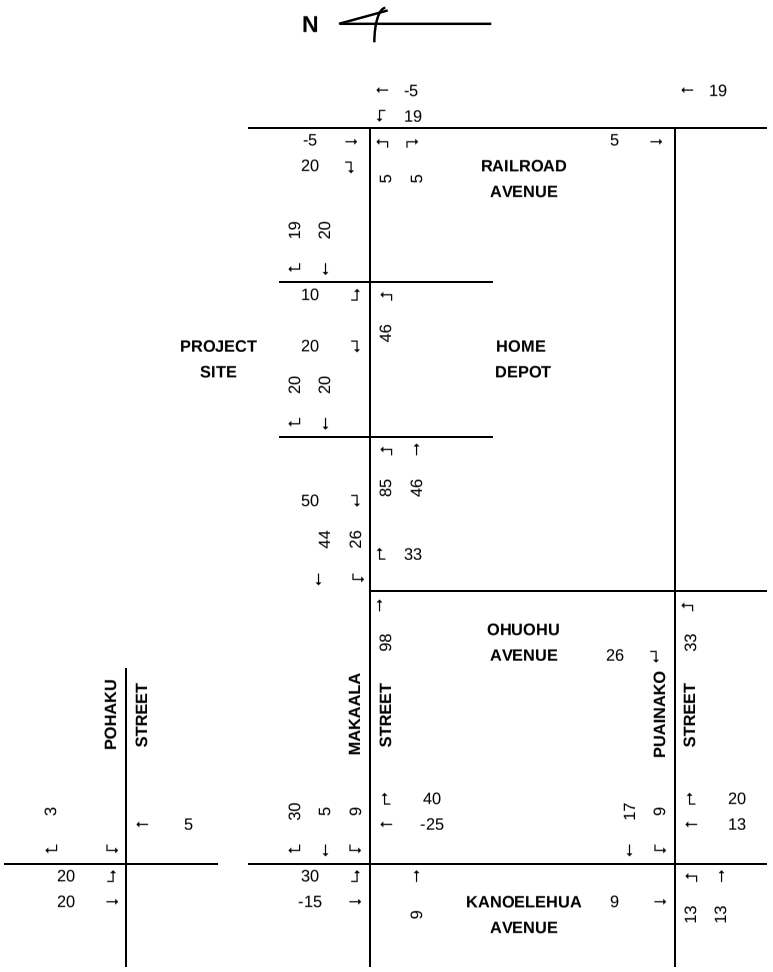
INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST PUAINAKO STREET/RAILROAD AVENUE INTERSECTION																		
Puainako St EB Right Turn	C	21.3	C	23.2	C	23.8	C	16.5	C	16.6	C	18.5	C	15.2	C	16.7	C	17.9
Puainako St EB Left Turn	A	9.4	A	9.5	A	9.5	B	11.5	B	11.7	B	12.0	B	10.1	B	10.2	B	10.4
Railroad Ave NB Left Turn	A	7.9	A	7.9	A	7.9	A	8.6	A	8.7	A	8.8	A	8.2	A	8.3	A	8.3
EAST PUAINAKO STREET/OHUOHU AVENUE INTERSECTION																		
Ohuohu St NB	C	15.6	C	16.3	C	19.2	C	19.0	C	20.5	F	56.0	C	24.1	D	27.1	F	<100
Ohuohu St SB	B	10.4	B	10.5	B	10.7	B	13.4	B	13.9	C	21.5	B	13.3	B	14.0	D	26.7
Puainako St EB Left Turn	A	7.7	A	7.7	A	7.8	A	7.8	A	7.8	A	8.0	A	8.0	A	8.0	A	8.6
Puainako St WB Left Turn	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5
EAST PUAINAKO STREET/OHUOHU AVENUE INTERSECTION WITH 4 WAY STOP																		
OVERALL					A	9.2					B	12.0					C	15.3
Puainako St EB					A	9.7					B	12.3					C	19.4
Puainako St WB					A	9.4					B	11.6					B	12.9
Ohuohu St NB					A	8.9					A	9.3					A	9.5
Ohuohu St SB					A	8.1					B	12.4					B	12.4

TABLE 5 (CONTINUED)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST MAKAALA STREET/RAILROAD AVENUE INTERSECTION																		
Makaala St EB Right Turn	A	9.8	A	9.9	A	10.0	B	12.3	B	12.6	B	13.6	B	10.6	B	10.8	B	11.4
Makaala St EB Left Turn	C	19.8	C	21.3	C	23.4	C	19.9	C	21.5	D	29.8	C	19.4	C	21.0	F	51.6
Railroad Ave NB Left Turn	A	8.1	A	8.1	A	8.3	A	8.9	A	9.0	A	9.6	A	8.3	A	8.4	A	8.8
EAST MAKAALA STREET/HOME DEPOT ACCESS/PROPOSED PROJECT ACCESS																		
Home Depot DW NB LR	B	10.1	B	10.2	B	14.3	B	11.4	B	11.6	F	>100	B	13.1	B	13.5	F	>100
Prop. Project DW SB LR					A	9.2					C	17.6					F	73.4
Makaala St EB Left Turn					A	7.9					A	9.6					B	11.1
Makaala St WB Left Turn	A	7.6	A	7.6	A	7.7	A	7.8	A	7.9	A	8.3	A	8.1	A	8.1	A	9.0
EAST MAKAALA STREET/OHUOHU AVENUE INTERSECTION																		
Ohuohu St NB	B	11.4	B	11.7	B	14.4	C	17.7	C	19.2	F	>100	D	30.6	E	37.7	F	>100
Makaala St WB Left Turn	A	7.7	A	7.8	A	8.1	A	8.3	A	8.4	B	11.3	A	8.4	A	8.5	B	12.9
EAST MAKAALA STREET/OHUOHU AVENUE INTERSECTION WITH 3 WAY STOP																		
OVERALL					A	9.6					C	25.0					F	53.3
Makaala St EB					A	9.6					C	23.3					F	51.8
Makaala St WB					A	9.9					D	32.1					F	81.3
Ohuohu St NB					A	9.2					A	9.7					B	11.9

TABLE 5 (CONTINUED)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

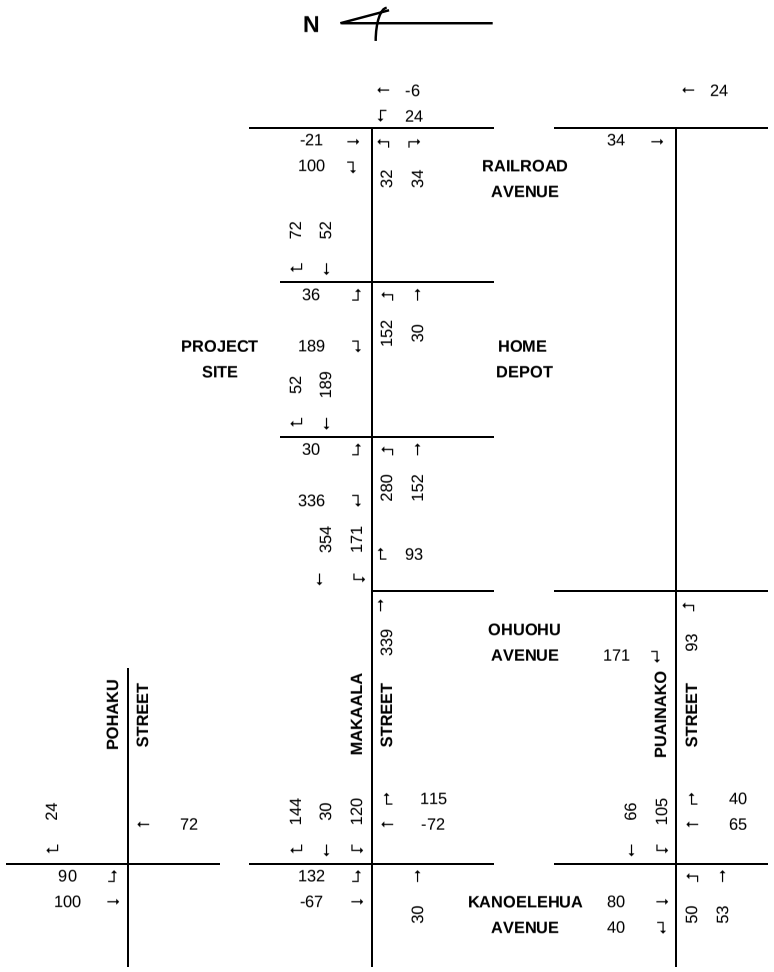
INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST MAKAALA STREET/WALMART EAST DRIVEWAY																		
PK Mall NB through/right	B	13.6	B	14	B	12.3	B	13.6	B	14	D	25.3				N/A		
PK Mall NB Left Turn	C	16.6	C	17.4	C	21.4	D	32.5	E	36.8	F	>100						
Walmart West SB Right Tu	B	11.4	B	11.8	B	13.2	C	15.1	C	16.1	F	56.8						
Walmart West SB Left/Thr	C	17.9	C	18.8	C	24.1	D	29.2	D	32.7	F	>100						
Makaala St EB Left Turn	A	8.3	A	8.4	A	8.7	A	8.6	A	8.7	B	10.5						
Makaala St WB Left Turn	A	7.7	A	7.8	A	8	A	8.1	A	8.2	A	9.3						
EAST MAKAALA STREET/WALMART WEST DRIVEWAY																		
PK Mall NB through/right	B	14.1	B	14.6	B	14.7	D	31.2	E	37.2	F	>100				N/A		
PK Mall NB Left Turn	C	22.4	C	23.8	D	29.8	F	>100	F	65.8	F	>100						
Walmart West SB Right Tu	A	10	B	10.1	B	10.7	D	32.1	E	44.5	F	>100						
Walmart West SB Left/Thr	C	20.1	C	21.3	D	27.1	F	86	F	>100	F	>100						
Makaala St EB Left Turn	A	8.2	A	8.3	A	8.6	A	9.6	A	9.8	B	12.4						
Makaala St WB Left Turn	A	8	A	8.1	A	8.3	A	9.1	A	9.2	B	10.7						
KANOELEHUA AVENUE/POHAKU STREET INTERSECTION																		
Pohaku St WB Right Turn	C	21.9	C	24.1	C	24.5	C	18.6	C	20.3	C	24.7	F	>100	F	>100	F	>100
Pohaku St WB Left Turn	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100
Kanoelehua Ave NB Left T	C	24.8	D	29.6	D	33.8	C	17.9	C	20.5	D	37.5	F	>100	F	>100	F	>100



Not to scale

MORNING PEAK HOUR

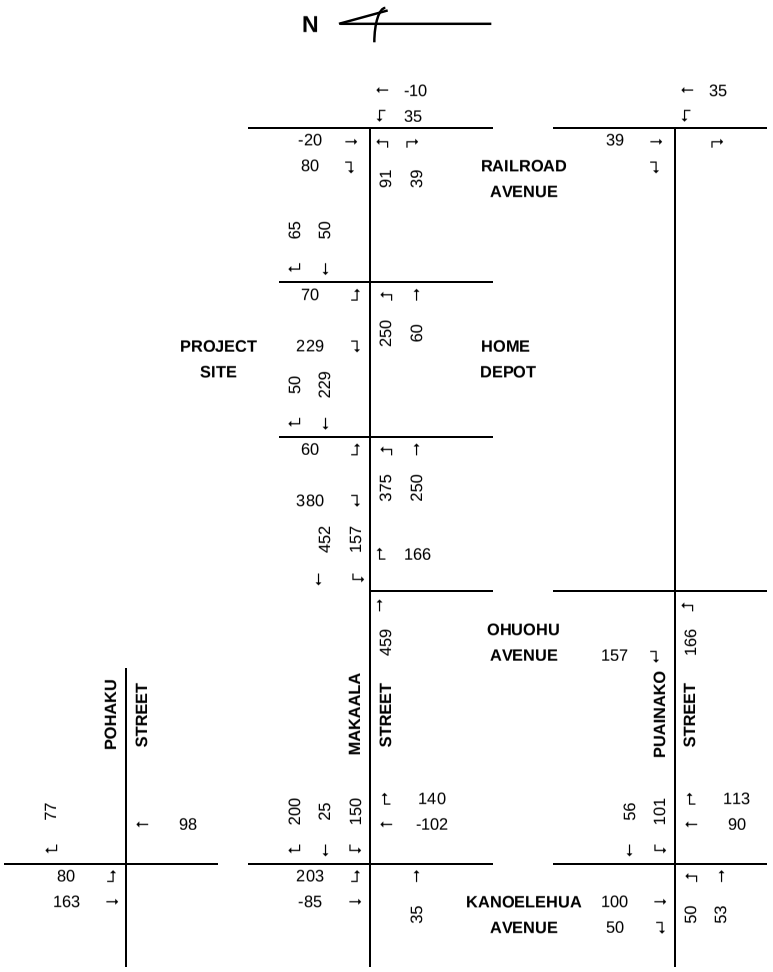
PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8A



Not to scale

AFTERNOON PEAK HOUR

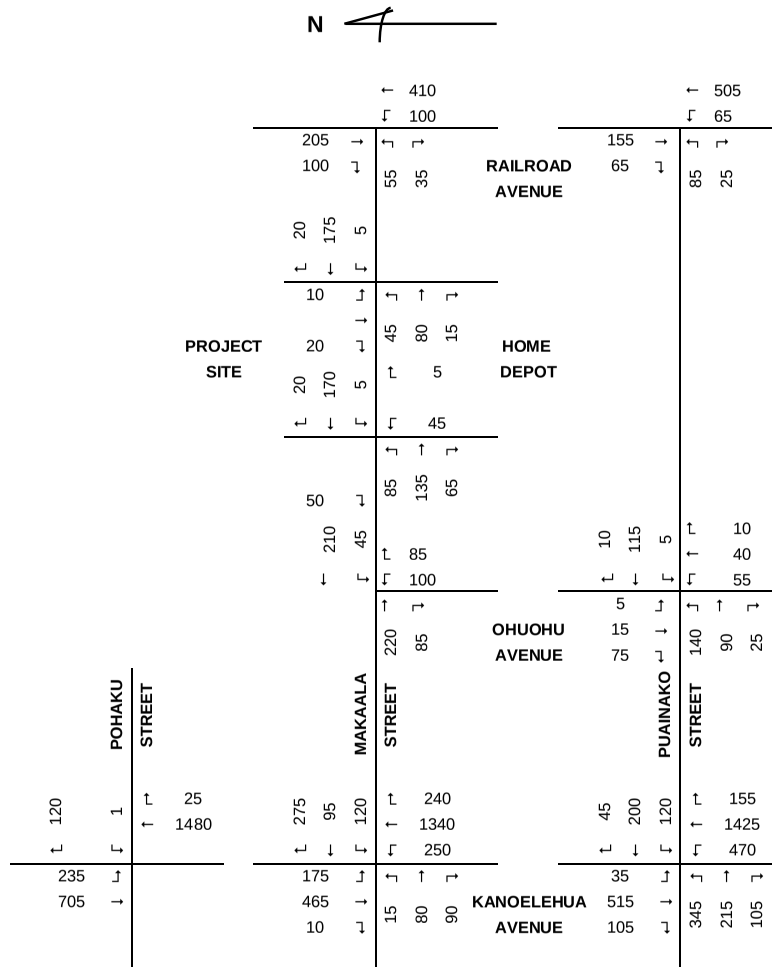
PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8B



Not to scale

SATURDAY MID-DAY

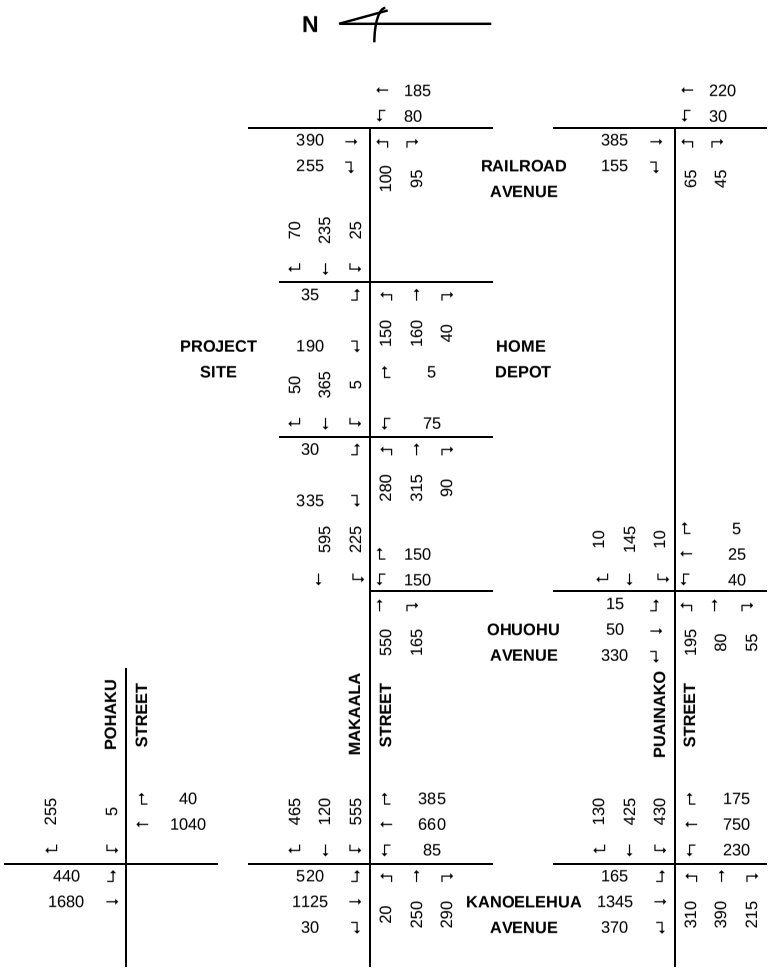
PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8C



Not to scale

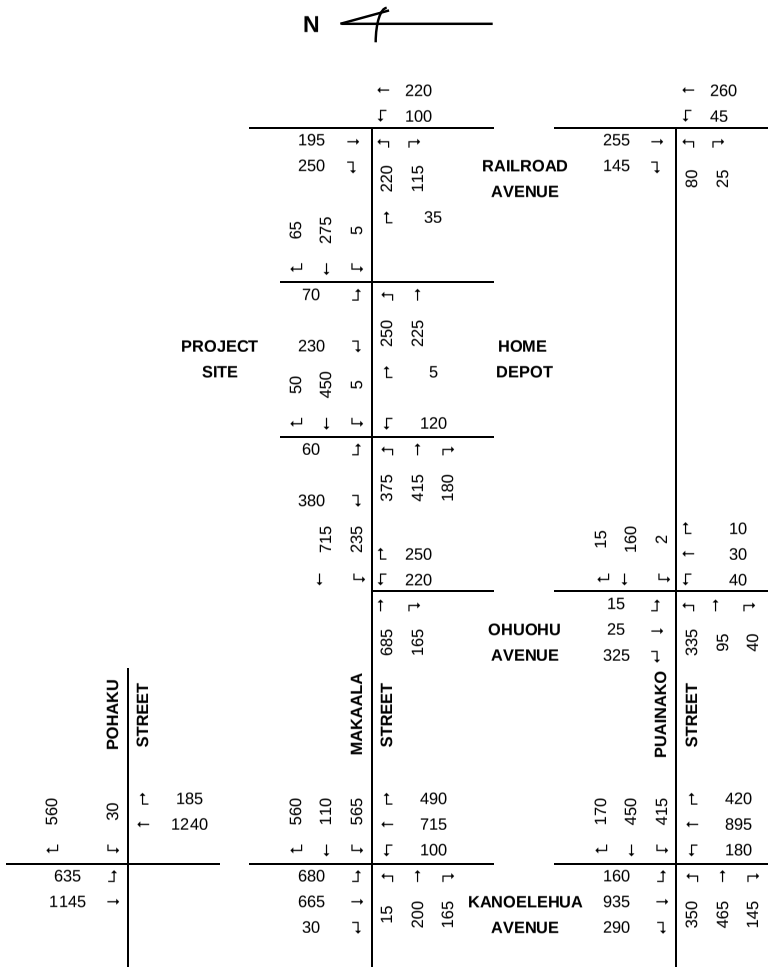
MORNING PEAK HOUR

2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9A



AFTERNOON PEAK HOUR

2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9B



SATURDAY MID-DAY

2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9C

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

FEB - 4 2009

February 2, 2009

Group 70 International, Inc.
925 Bethel Street 5th Floor
Honolulu, Hawaii 96813

Attention: Ms. Kim Evans, Planner

Ladies and Gentlemen:

Subject: East Maka'ala Mixed Use Development

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR), Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comment.

Other than the comments from Land Division-Hawaii District, Engineering Division, the Department of Land and Natural Resources has no other comments to offer on the subject matter. Should you have any questions, please feel free to call our office at 587-0433. Thank you.

Sincerely,

Morris M. Atta
Administrator

Cc: OEQC
DHHL

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

RECEIVED
LAND DIVISION
2009 JAN 13 A 11:15
DEPT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

January 5, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
_Office of Conservation & Coastal Lands
_x_Land Division –Hawaii District/Keith Chun

FROM: Morris M. Atta
SUBJECT: Draft Environmental Assessment for East Maka'ala Mixed use Development
LOCATION: Hilo, Hawaii, TMK: (3) 2-2-47:59
APPLICANT: Group 70 International, Inc. on behalf of DHHL

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
( ) We have no comments.
(X) Comments are attached.

Signed:
Date: 1/13/09

DEPARTMENT OF LAND AND NATURAL RESOURCES
ENGINEERING DIVISION

LA/MorrisAtta
Ref.: DEAEastMakaalaMixedDev
Hawaii.419

( ) We confirm that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Flood Zone ___.

( ) Please take note that the project site, according to the Flood Insurance Rate Map (FIRM), is located in Zone X. The National Flood Insurance Program (NFIP) does not have any regulations for development within these areas.

( ) Please note that the correct Flood Zone Designation for the project site according to the Flood Insurance Rate Map (FIRM) is ___.

( ) Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken. If there are any questions, please contact the State NFIP Coordinator, Ms. Carol Tyau-Beam, of the Department of Land and Natural Resources, Engineering Division at (808) 587-0267.

Please be advised that 44CFR indicates the minimum standards set forth by the NFIP. Your Community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

( ) Mr. Robert Sumitomo (808) 768-8097 or Mr. Mario Siu Li at (808) 768-8098 of the City and County of Honolulu, Department of Planning and Permitting.
( ) Mr. Kelly Gomes at (808) 961-8327 (Hilo) or Mr. Kiran Emler at (808) 327-3530 (Kona) of the County of Hawaii, Department of Public Works.
( ) Mr. Francis Cerizo at (808) 270-7771 of the County of Maui, Department of Planning.
( ) Mr. Mario Antonio at (808) 241-6620 of the County of Kauai, Department of Public Works.

( ) The applicant should include project water demands and infrastructure required to meet water demands. Please note that the implementation of any State-sponsored projects requiring water service from the Honolulu Board of Water Supply system must first obtain water allocation credits from the Engineering Division before it can receive a building permit and/or water meter.

( ) The applicant should provide the water demands and calculations to the Engineering Division so it can be included in the State Water Projects Plan Update.

( ) Additional Comments: _____

_____

(X) Other: Our previous comments dated August 29, 2008, which is included in the Draft Environmental Assessment document, still apply.

Should you have any questions, please call Ms. Suzie Agraan of the Planning Branch at 587-0258.

Signed: _____
ERIC T. HIRANO, CHIEF ENGINEER

Date: 1/13/09

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
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

January 5, 2009

MEMORANDUM

TO: **DLNR Agencies:**
x Div. of Aquatic Resources
__Div. of Boating & Ocean Recreation
x Engineering Division
__Div. of Forestry & Wildlife
__Div. of State Parks
__Commission on Water Resource Management
__Office of Conservation & Coastal Lands
x Land Division –Hawaii District Keith Chun

RECEIVED
LAND DIVISION
HILO, HAWAII
2009 JAN -7 A 10:14

FROM: Morris M. Atta
SUBJECT: Draft Environmental Assessment for East Maka'ala Mixed use Development
LOCATION: Hilo, Hawaii, TMK: (3) 2-2-47:59
APPLICANT: Group 70 International, Inc. on behalf of DHHL

Transmitted for your review and comment on the above referenced document. We would appreciate your comments on this document. Please submit any comments by February 1, 2009.

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact my office at 587-0433. Thank you.

Attachments

( ) We have no objections.
(✓) We have no comments.
( ) Comments are attached.

Signed: _____
Date: 1/8/09

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

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James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Morris Atta, Administrator
State of Hawai'i
Department of Land and Natural Resources
Land Division
P.O. Box 621
Honolulu, HI 96809

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Atta,

Thank you for your comments regarding the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We have received your letter dated February 2, 2009, in which you provided the comments from the various divisions of DLNR. We appreciate your circulation of the EA and compilation of the comments.

We note that the Hawaii District Land Division has no comments.

We note that the comments provided by the Engineering Division on August 29, 2008 still apply. They requested that water demands and calculations be provided to the DLNR Engineering Division so it can be included in the State Water Projects Plan Update. As mentioned in previous responses, these figures will be forwarded when available.

Your comment letter and the corresponding response will be included in the Final Environmental Assessment (FEA) report, and we will send you a copy of the FEA for your review.

Thank you for participating in the environmental review process.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL, OEQC

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

JAN 29 2009

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

January 23, 2009

Kim Evans, Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

LOG NO: 2009.0027
DOC NO: 0901MD28
Archaeology

Dear Ms. Evans:

SUBJECT: Chapter 6E-8 Historic Preservation Review –
Request for Comment on the Draft Environmental Assessment for the DHHL East Maka`ala Mixed Use Development
Waiakea Ahupua'a, South Hilo District, Island of Hawai'i
TMK: (3) 2-2-047:072

Thank you for the opportunity to comment on the aforementioned project, which we received on January 9, 2009. Structures remaining on these parcels have been determined to belong to a previous use in the late 1960s to 1980s; as they are under 50 years old they do not qualify as historic structures and are therefore not under our jurisdiction.

We determine that **no historic properties will be affected** by this project because:

- ☐ Intensive cultivation has altered the land
- ☒ Residential development/urbanization has altered the land
- ☒ Previous grubbing/grading has altered the land
- ☐ An accepted archaeological inventory survey (AIS) found no historic properties
- ☐ SHPD previously reviewed this project and mitigation has been completed
- ☒ Other: *A site visit conducted by Rechtman Consulting LLC, an archaeological company on September 15, 2008 determined that there are no historic properties present, and SHPD concurred (Log No. 2009.0038, Doc No. 0901MD27).*

In the event that historic resources, including human skeletal remains, cultural materials, lava tubes, and lava blisters/bubbles are identified during the construction activities, all work needs to cease in the immediate vicinity of the find, the find needs to be protected from additional disturbance, and the State Historic Preservation Division, Hawaii Island Section, needs to be contacted immediately at (808) 933-7653. If you have questions about this letter please contact Morgan Davis at (808) 933-7650.

Aloha,

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
State Historic Preservation Division

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
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Hitoshi Hida
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M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Ms. Nancy McMahon
Deputy SHPO/ State Archaeologist and Historic Preservation Manager
State of Hawai'i, Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Boulevard, Room 555
Kapolei, HI 96707

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Ms. McMahon,

Thank you for your comment letter dated January 23, 2009, regarding the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We appreciate the State Historic Preservation Division's determination that no historic properties will be affected by this project because of the following:

1. Residential development / urbanization has altered the land.
2. Previous grubbing / grading has altered the land.
3. A site visit conducted by Rechtman Consulting LLC, an archaeological company on September 15, 2008 determined that there are no historic properties present, and SHPD concurred (Log No. 2009.0038, Doc No. 091MD27).

In the event that historic resources, including human skeletal remains, cultural materials, lava tubes, and lava blisters / bubbles are identified during the construction activities, all work will cease in the immediate vicinity of the find, the find will be protected from additional disturbance, and the State Historic Preservation Division, Hawai'i Island Section, will be contacted at 808-933-7653.

Your comment letter and the corresponding response will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Kim Evans
Planner

cc: DHHL, OEQC

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EPO-09-004

February 10, 2009

Mr. Kim Evans, Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813

Dear Mr. Evans:

SUBJECT: Draft Environmental Assessment for Department of Hawaiian Home Lands (DHHL) East Maka'ala Mixed Use Development
Waiakea, South Hilo, Island of Hawaii, Hawaii
TMK: (3) 2-2-047: 059

Thank you for allowing us to review and comment on the subject application. The application was routed to the various branches of the Environmental Health Administration. We have the following Clean Water Branch, Clean Air Branch and General comments.

Clean Water Branch

The Department of Health, Clean Water Branch (CWB), has reviewed the subject document and offers these comments on your project. Please note that our review is based solely on the information provided in the subject document and its compliance with Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at http://www.hawaii.gov/health/environmental/env-planning/landuse/CWB-standardcomment.pdf.

1. Any project and its potential impacts to State waters must meet the following criteria:

   a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.

   b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.

   c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).

2. You are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55). For the following types of discharges into Class A or Class 2 State waters, you may apply for NPDES general permit coverage by submitting a Notice of Intent (NOI) form:
   a. Storm water associated with construction activities, including clearing, grading, and excavation, that result in the disturbance of equal to or greater than one (1) acre of total land area. The total land area includes a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under a larger common plan of development or sale. An NPDES permit is required before the start of the construction activities.

   b. Hydrotesting water.

   c. Construction dewatering effluent.

   You must submit a separate NOI form for each type of discharge at least 30 calendar days prior to the start of the discharge activity, except when applying for coverage for discharges of storm water associated with construction activity. For this type of discharge, the NOI must be submitted 30 calendar days before to the start of construction activities. The NOI forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/genl-index.html.

3. For types of wastewater not listed in Item 2 above or wastewater discharging into Class 1 or Class AA waters, you may need an NPDES individual permit. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. The NPDES application forms may be picked up at our office or downloaded from our website at http://www.hawaii.gov/health/environmental/water/cleanwater/forms/indiv-index.html.

4. You must also submit a copy of the NOI or NPDES permit application to the State Department of Land and Natural Resources, State Historic Preservation Division (SHPD), or demonstrate to the satisfaction of the CWB that SHPD has or is in the process of evaluating your project. Please submit a copy of your request for review by SHPD or SHPD's determination letter for the project along with your NOI or NPDES permit application, as applicable.

5. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 Water Quality Certification are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of $25,000 per day per violation.

If you have any questions, please visit our website at http://www.hawaii.gov/health/environmental/water/cleanwater/index.html, or contact the Engineering Section, CWB, at 586-4309.

Clean Air Branch

Control of Fugitive Dust

Fugitive dust emissions occur during all phases of construction and operations. Activities close to existing residences, businesses, public areas or thoroughfares can cause dust problems. For cases involving mixed land use, we strongly recommend that buffer zones be established, wherever possible, in order to alleviate potential nuisance problems. We recommend that the contractors operate under a dust control management plan. The plan does not require the Department of Health approval, however it will help with identifying and minimizing the dust problems from the proposed project.

Examples of measures that can be included in the dust control plan are:

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

All activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust. If you have any questions, please contact the Clean Air Branch at 586-4200

General

We strongly recommend that you review all of the Standard Comments on our website: www.hawaii.gov/health/environmental/env-planning/landuse/landuse.html. Any comments specifically applicable to this project should be adhered to.

If there are any questions about these comments please contact Jiacai Liu with the Environmental Planning Office at 586-4346.

Sincerely,

KELVIN H. SUNADA, MANAGER
Environmental Planning Office

c: EPO
CWB
CAB
EH-Hawaii

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

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AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Kelvin H. Sunada, Manager
State of Hawai'i, Department of Health
Environmental Planning Office
P.O. Box 3378
Honolulu, HI 96801

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Sunada,

Thank you for your comment letter dated February 10, 2009, regarding your review of the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development

We offer the following responses to the concerns you raised:

Clean Water Branch. The project will comply with the requirements of the Clean Water Act, including the rules under HAR, Sections 11-54 and 11-55 for submission of application for general permit coverage authorized under the National Pollutant Discharge Elimination System (NPDES). The proposed development will comply with applicable discharge requirements. Thank you for articulating the requirements.

Clean Air Branch. Development activities will comply with the provisions of HAR §11-60.1-33 on Fugitive Dust. We appreciate your recommendations that can be implemented to control dust and will take them into consideration as development plans progress. Mitigation measures to minimize air quality impacts during construction include dust control measures such as frequent watering and rapid establishment of gravel and plant materials once grading is completed.

Your comment letter and the corresponding response will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

Kim Evans
Planner

cc: DHHL, OEQC

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

APR - 9 2009

HRD09/3798B

April 6, 2009

George I. Atta
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813

RE: Request for comments on the Draft Environmental Assessment for the Department of Hawaiian Home Lands' East Maka'ala Mixed Use Development, Hilo, TMK: 2-2-47:59.

Aloha e George I. Atta,

The Office of Hawaiian Affairs (OHA) received the above-mentioned letter on January 6, 2009. The Department of Hawaiian Home Lands entered into a joint least agreement with Target Corporation and Safeway Inc. for the construction, operation and management of an industrial/commercial mixed-use development and related facilities on 15.5 acres of Hawaiian Home Lands at the corner of East Maka'ala Street and Railroad Avenue, in South Hilo, Hawai'i. OHA has reviewed the project and offers the following comments.

We will rely on the applicant's assurances that should iwi kūpuna or Native Hawaiian cultural or traditional deposits be found during the construction of the project, work will cease, and the appropriate agencies will be contacted pursuant to applicable law.

In addition, OHA recommends that the applicant use native vegetation in its landscaping plan for the subject parcel. Landscaping with native plants furthers the traditional Hawaiian concept of mālama 'āina and creates a more Hawaiian sense of place.

Thank you for the opportunity to comment. If you have further questions, please contact Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

'O wau iho nō me ka 'oia'i'o,

Clyde W. Nāmu'o
Administrator

C: Katherine Puana Kealoha, Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

Peter "Kahana" Albinio, Land Management Division
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, HI 96822

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 13, 2009

Clyde W. Nāmu'o, Administrator
State of Hawai'i
Office of Hawaiian Affairs
711 Kapi'olani Blvd., Suite 500
Honolulu, HI 96813

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Aloha e Mr. Nāmu'o,

Thank you for your comment letter dated April 6, 2009 regarding the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We want to reassure you that if during construction any iwi kūpuna or native Hawaiian cultural or traditional deposits are inadvertently discovered, work will cease, and the appropriate agencies will be contacted pursuant to applicable law. Additionally, all construction plans will include the following language as normally recommended by the State Historic Preservation Division of the Department of Land and Natural Resources:

> Should historic resources including human skeletal remains, cultural materials, burials, lava tubes, lava blisters, and concentrations of shell or charcoal be encountered during the construction activities, work shall cease immediately in the immediate vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact SHPD and the district representative of the Hawai'i Island Burial Council to assess the significance of the find and recommend an appropriate mitigation measure, if necessary.

Your suggestion to utilize native vegetation in the landscape plan for the subject parcel is incorporated in the Final EA as a recommendation to Safeway Inc. and Target Corp. as Department of Hawaiian Home Lands continues negotiations with them for a joint lease agreement for the subject parcel.

Your comment letter and the corresponding response will be included in the Final EA. If you have any questions, please feel free to contact me at 808-523-5866 ext. 103.

Sincerely,

GROUP 70 INTERNATIONAL, INC.

George I. Atta

George I. Atta, AICP
Principal

cc: DHHL, OEQC

William P. Kenoi
Mayor

BJ Leithead Todd
Acting Deputy Planning Director

County of Hawaii
PLANNING DEPARTMENT
Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawaii 96720
Phone (808) 961-8288 • Fax (808) 961-8742

FEB - 9 2009

February 3, 2009

Mr. George I. Atta, AICP
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

Dear Mr. Atta:

Subject:	**Draft Environmental Assessment**
Applicant:	**Department of Hawaiian Home Lands (DHHL)**
Project:	**DHHL East Maka'ala Mixed Use Development**
TMK:	**(3) 2-2-47:59 Lot 5-A-1 Waiākea, South Hilo; Hawai'i**

Thank you for the opportunity to review a comment on this Draft Environmental Assessment. After careful review we have no further comments at this time.

Should you have questions, please feel welcome to contact Christian Kay of my staff at 961-8288, extension 259.

Sincerely,

BJ Leithead Todd

BJ LEITHEAD TODD
Acting Deputy Planning Director

CRK:cs
I:\Coh31\planning\public\wpwin60\CKay\EA Response Letters\Group70_Evans_DHHL_MixUseEA.doc

cc: Office of Environmental Quality Control
Department of Hawaiian Homelands

Hawai'i County is an Equal Opportunity Provider and Employer

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
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AICP

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AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Ms. BJ Leithead Todd, Acting Deputy Planning Director
County of Hawai'i
Planning Department
Aupuni Center
101 Pauahi Street, Suite 3
Hilo, HI 96720

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Ms. Todd,

Thank you for your letter dated February 03, 2009, regarding your review of the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We acknowledge that you have no comments at this time.

Your comment letter and this response will be included in the Final Environmental Assessment (FEA).

We appreciate your participation in the environmental review process.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

January 27, 2009

JAN 29 2009

Mr. George I. Atta
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, HI 96813-4307

DRAFT ENVIRONMENTAL ASSESSMENT
DHHL EAST MAKAALA MIXED USE DEVELOPMENT
SAFEWAY AND TARGET - HILO
TAX MAP KEY 2-2-047:072

We have reviewed the subject Draft Environmental Assessment and have the following comments.

Our comments from our September 11, 2008, Pre-Environmental Assessment consultation letter to your office still stand.

Please be informed that we have received estimated water usage calculations for the proposed development and have confirmed that the Department can provide the estimated total average daily demand of 27,340 gallons per day (GPD), which is equivalent to 69 units of water at 400 GPD per unit. Our letter, in response to the water usage calculations, is attached for your information.

Should there be any questions, you may contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

Enc.

...Water brings progress...

The Department of Water Supply is an Equal Opportunity provider and employer. To file a complaint of discrimination, write: USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410. Or call (202) 720-5964 (voice and TDD)

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

January 20, 2009

Ms. Liana S.F. Choy
Sato & Associates, Inc.
2046 South King Street
Honolulu, HI 96826

WATER AVAILABILITY AND FIRE FLOW DATA
SAFEWAY AND TARGET - HILO
TAX MAP KEY 2-2-047:072

We have reviewed the projected domestic water demand for the subject projects and find them acceptable. Based on the information provided, the proposed Safeway supermarket will require an estimated 23,697 gallons per day (GPD), which is equal to 59 units of water at 400 GPD per unit; and the proposed Target superstore will require an estimated 3,643 GPD, which is equal to 10 units of water at 400 GPD per unit.

We can confirm that the Department's existing water system facilities can accommodate the total estimated demand of 27,340 GPD, or 69 units of water, for the proposed Safeway and Target stores. Water can be made available from the existing 12-inch waterline within Railroad Avenue or from the existing 8-inch waterline within Makaala Street, both of which front the project site.

Per your request, please find the attached fire flow test results performed for The Home Depot store, located across Makaala Street from the project site, on May 23, 2003.

Should there be any questions, you may contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

Enc.

... Water brings progress...

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M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Milton D. Pavao, P.E., Manager
County of Hawai'i
Department of Water Supply
345 Kekūanaō'a Street, Suite 20
Hilo, HI 96720

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Pavao,

Thank you for your comments dated January 27, 2009, in regards to the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We recognize that your concerns raised in your letter dated September 11, 2008, still stand. These include your request to provide construction plans depicting the location and size of the service laterals fronting the parcel and the location of any new service laterals to be installed for DWS review. Those plans will be forwarded for your review when available.

Thank you for confirming that the Hawaii County Department of Water Supply (DWS) is able to supply the total average daily demand for the proposed Safeway and Target stores of 27,340 gallons per day (GPD), which is equivalent to 69 units of water at 400 GPD per unit.

We are also in receipt of a letter dated January 20, 2009, regarding water availability, in which you were able to confirm water access from existing 12-inch waterline within Railroad Avenue or from the existing 8-inch waterline within Maka'ala Street which fronts the project site.

Thank you again for your participation in the environmental review process. Your comment letters will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL, IN

Kim Evans
Planner

cc: DHHL, OEQC

William P. Kenoi
Mayor

Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAII FIRE DEPARTMENT
25 Aupuni Street • Suite 103 • Hilo, Hawai'i 96720
(808) 981-8394 • Fax (808) 981-2037

FEB 12 2009

January 26, 2009

Attention: Kim Evans
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

SUBJECT: DEA FOR DHHL EAST MAKAALA MIXED USE DVELOPMENT
WAIAKEA
TAX MAP KEY: 2-2-47:59

Please note that this is being resent in correction to previous comments sent dated January 13, 2009.

In regards to the above-mentioned draft environmental assessment, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"Fire Apparatus Access Roads

"Sec. 10.207. (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"EXCEPTIONS: 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

DARRYL OLIVEIRA
Fire Chief

RP:lpc

cc: Katherine Puana Kealoha, Office of Environmental Quality Control
Peter "Kahana" Albinio, Department of Hawaiian Homelands

GROUP 70
INTERNATIONAL

PRINCIPALS

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Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Darryl J. Oliveira
County of Hawaii
Fire Department
25 Aupuni Street, Suite 103
Hilo, HI 96720

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Oliveira,

Thank you for your review and comments of the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development project. We are in receipt of both comment letters dated January 26, 2009 which replaced your letter dated January 13, 2009.

Thank you for providing the Uniform Fire Code (UFC) Section 10.207 with which the fire apparatus access roads will be in accordance as well as UFC Section 10.301(c) with which the water supply will be in accordance.

We reassure you that to ensure safety and access in the event of a fire, provisions have been made for the construction of a fire apparatus access road in compliance with the requirements referenced from UFC Section 10.207.

An approved water supply (including on-site fire hydrants and mains, as required) capable of supplying the required fire flow for fire protection will be provided, as we wrote previously, pursuant to the UFC Section 10.301 (c), as referenced in your comment letter.

We appreciate your participation in the environmental review process. Your comment letter and this response will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL, OEQC

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT

349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-2389

January 16, 2009

JAN 21 2009

Mr. George I. Atta, AICP
Principal Planner
Group 70 International, Inc.
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Mr. Atta:

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Property
TMK (3) 2-2-47: 59
Waiakea, South Hilo, Hawaii

Staff, upon reviewing the provided Draft Environmental Assessment, comments as follows.

Our view regarding this project's impact to traffic levels on both Railroad Avenue and Maka'ala Street remains the same. Any significant increases to present traffic levels on Maka'ala Street may negatively impact traffic safety, potentially leading to an increase in the incidence of traffic casualties on Maka'ala Street. Of greatest concern are the impact traffic levels will have at the intersection, providing vehicular access into Prince Kuhio Plaza and Waiakea Center at the west end of Maka'ala Street.

It is our view that the mitigation measures proposed within Section 3.3.5 **Roads and Traffic** of the Draft Environmental Assessment are adequate, except for the measures being proposed for the above-mentioned intersection. We feel that providing a second through lane at this intersection will do little to mitigate present traffic safety concerns at this intersection. Rather, traffic signalization and related improvements are necessary for this intersection at this time.

Thank you for allowing us the opportunity to comment.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

KV

cc: Office of Environmental Quality Control
Department of Hawaiian Home Lands

"Hawai'i County is an Equal Opportunity Provider and Employer"

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AIA, LEED AP

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M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Derek D. Pacheco, Assistant Police Chief
County of Hawaii
Police Department
Area I Operations Bureau
349 Kapiolani Street
Hilo, HI 96720

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Pacheco,

Thank you for your time and attention to this matter. We are in receipt of your comment letter dated January 16, 2009 regarding your review of the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We appreciate your assessment that the bulk of the mitigation measures relating to potential traffic impacts are adequate.

Your remaining concern, the intersection providing vehicular access into Prince Kūhiō Plaza and Waiākea Center at the west end of Maka'ala Street, has been re-evaluated.

Your suggestion to change the mitigation measure at this intersection from a second through lane to traffic signalization and related improvements is being considered.

We appreciate your participation in the environmental review process.

Your comment letter and this response will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL, OEQC

Sandwich Isles Communications, Inc.
A Waimana Company

January 09, 2009

Ms. Kim Evans
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawaii 96813-4307

Dear Ms. Evans:

Subject: Draft Environmental Assessment
Department of Hawaiian Home Lands (DHHL) East Maka'ala Mixed Use Development, Waiakea, South Hilo, Hawaii, TMK (3) 2-2-47:072

Thank you for requesting the Sandwich Isles Communication (SIC) review of the subject project on East Maka'ala Street in South Hilo.

SIC's initial comments are as follows:

1. Section 3.3.1 Please correct to state that SIC will be the Data and Telecommunication provider and that Oceanic Time Warner will be the cable T.V. provider.
2. Section 5 page 5-4 Please correct to state that SIC will be the Data and Telecommunication provider and that Oceanic Time Warner Cable will be the cable T.V. provider.

Thank you for the opportunity to comment. If you have additional questions please contact Sonny Perreira by phone at (808)524-8400 or via e-mail at sperreira@sandwichisles.com

Sincerely,

Rodney Kaulupali
Construction Director
Sandwich Isles Communication

cc: Office of Environmental Quality Control
Department of Hawaiian Home Lands

1003 Bishop Street, Pauahi Tower 27th Floor, Honolulu, HI 96813 ~ (808) 524-8400 ~ Fax (808) 599-4653
email: info@sandwichisles.com

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Arch.D., FAIA, AICP

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AIA

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Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Mr. Rodney Kaulupali, Construction Director
Sandwich Isles Communications, Inc
1003 Bishop Street, Pauahi Tower, 27th Fl.
Honolulu, HI 96813

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Mr. Kaulupali,

Thank you for your time and attention to this matter.

We are in receipt of your comment letter dated January 09, 2009, in regards to the Draft Environmental Assessment for the DHHL East Maka'ala Mixed Use Development.

We thank you for your clarification and will make the requested corrections in the Final EA noting that Sandwich Isles Communications, Inc. (SIC) will be the Data and Telecommunication provider and that Oceanic Time Warner will be the cable T.V. provider.

We appreciate your participation in the environmental review process.

Your comment letter and this response will be included in the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL, OEQC

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

Kim Evans

From: Cory (Martha) Harden [mh@interpac.net]
Sent: Wednesday, February 04, 2009 10:22 AM
To: GVT STA HI OEQC; GVT STA HI DHHL Albinio; EastMakaalaEA
Subject: East Maka'ala EA comments

please acknowledge receipt

LETTER TO EDITOR

New Target/Safeway

Arsenic, chromium, hexavalent chromium, and copper may be contaminating part of the proposed Target/Safeway site behind Wal-Mart. A study was done--but not released to the current tenant, nor the consultants doing the Target/Safeway EA (Environmental Assessment.)

We urge that thorough assessment, and plans for cleanup, be included in the EA--not done by the developer, as planned, with far less public scrutiny.

Target/ Safeway "has the potential to meet much of the intent of the 2050 Sustainable Plan", says the EA. We feel it has much more potential to increase disruptive road and sewer construction, abandoned buildings from failed businesses, fossil fuel use, tailpipe emissions, traffic jams, and landfill overflow. If we are to have Target and a new Safeway we need to find ways to minimize their impact on our lives, on Hilo and on the planet.

How about some truly sustainable uses? A farmers' market, like the booming Maku'u Market. Processing facilities for local agriculture. Community buildings funded by economic stimulus money. All are allowed by current zoning.

Food supply lines thousands of miles long are vulnerable to rising oil prices, strikes, and natural and human disasters. We need local, sustainable food sources and a thriving local economy--not questions about contamination, plus more of an economic paradigm which may no longer be viable.

.....

Draft Environmental Assessment

Department of Hawaiian Home Lands East Maka'ala Mixed Use Development

December 2008

Comments from

Cory Harden, Sierra Club, Moku Loa group, PO Box 1137, Hilo, Hawaii 96721

808-968-8965, mh@interpac.net

January 2008

Summary

Thank you for the opportunity to comment. We support generating revenue for Hawaiian

Homelands infrastructure. We also support plans to plant native vegetation, shield lighting to

avoid disorienting birds, do sustainable stormwater mitigation, recycle, and use green building

practices. However, we have many concerns about this project and DEA.

Possible contamination by arsenic, chromium, hexavalent chromium, and copper should be

evaluated in this project EA, to allow more public input than a developer-funded study may allow.

The statement that the project "has the potential to meet much of the intent of the 2050

Sustainable Plan" appears to be unfounded or nowhere near as extensive as it can be.

Chemical contamination questions, more solid waste, more big box stores, more traffic, more

road-building, and a possible new sewer line do not appear sustainable to us. There is already

way too much traffic congestion in this area, especially getting on and off the main highway. The

entrances to Puainoko Shopping Center, Kuhio Shopping Center and Walmart are already highly

congested and the proposed SuperWalmart's impact must also be considered. The EA should

evaluate whether the cumulative impacts of all these factors trigger an EIS. The EA should also evaluate alternatives, such as currently permitted uses like farmers' markets, agriculture products processing, food manufacturing and processing, and community buildings.

Analysis saying "the market can absorb another large store" and the local economy is "stable"

seems overly optimistic and completely unfounded. We are concerned about three potential

abandoned buildings--Target, the new Safeway, and the old Safeway, a problem not new to Hilo

and especially to this shopping area. Will the Old Safeway or the Old Walmart be the next derelict building? Could the new buildings become victims of a far-away corporate decision in

our shaky national economy?

Increased traffic will require construction of new roads and traffic lights, and increase noxious

emissions. But the EA does not evaluate alternative transportation. It should present plans for

buses, taxis, mopeds, bicycles, skateboards, scooter boards, motorized and un-motorized

wheelchairs, and walking as well as charging stations for the imminent plug-in hybrids and totally

electric cars Obama energy independence policies will bring to Hawaii.

The EA should give more specifics on plans for solid waste, given our solid waste woes.

The need and feasibility of a new sewer line should be more thoroughly evaluated taking into

account all projected growth in the area (eg, SuperWalmart) and a reasonable reserve capacity

for the future.

In the spirit of the 2050 Sustainable Plan, the EA should evaluate use of solar and other carbon

free electric, and natural lighting and earth friendly ventilation/cooling.

Mahalo for considering our comments.

Specific Comments

p. 3-1 The project is not expected to have an effect on climatic conditions.

Emissions from shipping of building materials, construction, shopping traffic, manufacturing and

shipping of store products, and waste disposal will add to climate change. Large roof surfaces, huge black heat absorbing parking lots and additional roads all contribute to global warming unless proper mitigation is done.

p. 3-2 …increased vehicular traffic…may contribute to air quality degradation…

Please quantify, including the impact of additional traffic congestion.

p. 3-3 The curtailment of potential agricultural use…is not considered a significant impact.

Hawai'i imports about 90% of its food. If this long supply line fails due to rising oil prices (expected by many) or other factors, agricultural land will be needed.

p. 3-7 The site…is part of the Hilo Aquifer System…The groundwater is identified as a currently used fresh drinking water source.…However, the subject site is located below the underground injection control (UIC) line meaning the underlying aquifer would not be considered a drinking water source.

The first and second statements appear contradictory--please explain in terms understandable to the general public. This is especially important because of (1) arsenic, chromium, copper, and hexavalent chromium in the soil at the adjacent Hilo Wood Treating site and (2) possible pooling water on this project site near the boundary with Hilo Wood Treating.

p. 3-7 No botanical survey has been recently conducted within the project site.

A survey should be done to support conclusions.

p. 3-7 There is the possibility of pollution resulting from current operations at the site.

Please explain including impact on the Hilo Aquifer System.

p. 3-8 Utilization of native vegetation in the landscape plan is recommended.

We support this. We also suggest that native plants should be used to mitigate the impact of the large paved areas and huge roof structures and additional roads on global warming.

p. 3-9 ..all lighting will comply with…Hawai'i County Code…minimizing the threat of disorientation and downing of Hawaiian Petrels and Newell's Shearwaters…

We support this and remind that lighting must also comply with regulations limiting impact on the Mauna Kea observatories.

p. 3-17 The regional economy is more or less stable with a bias toward slow to modest growth…

Evaluate whether/ how this has changed with the current economic crisis, and how any change would affect assumptions and conclusions of this EA.

p. 3-18 …the spending of retirees/second home owners) [sic] and the underground economy may

contribute substantially more to the economy than acknowledged.

Please quantify, and evaluate whether these two factors change assumptions and conclusions of this EA.

p. 3-18 to 3-19 According to the [2003] *Land Use and Market Analysis [for Hilo Commercial Center] Report* [done for DHHL by Belt Collins and Wendell. R. Brooks, Jr.] new retail outlets with new products can cause the market to grow even without population growth or growth in personal income…[and] the market can absorb another large store such as Target.

How many new products would be offered compared to existing stores nearby--KTA, Wal-Mart, Office Max, and the nearby Prince Kuhio Mall? We think that for the good of our local economy and to reduce the impact on the planet the new Safeway and Target as well as the rest of the big stores in the area should commit to giving preference to locally grown and manufactured products.

Evaluate whether the report's conclusions are still valid in the current economic crisis, and how any change in conclusions would affect the EA's assumptions and conclusions.

Evaluate whether we could end up with several enormous abandoned buildings in the area including --Target, the new Safeway, the old Safeway, and the old Walmart, through economic hard times, or a business decision made far from Hawai'i?

p. 3-21 …Department of Public Works is unsure if the existing sewer line…can handle additional discharge…The concern is that…the calculated design peak flow may be over the capacity of the existing sewer line…This sewer study…could take several months.…Another proposal…is the construction of a new sewer line…This proposal is in need of discussion…A potential problem for this proposed sewer line is a dip in the road along Railroad Avenue. Because the proposals described above need to be further discussed, this report does not include a were system layout…

A sewer system layout should be completed before the EA is approved. It should include taking into account all projected growth in the area (eg, SuperWalmart) and a reasonable reserve capacity for the future.

p. 3-22 *We support the sustainable stormwater mitigation measures.*

p. 3-22 The amount of solid waste…has not been calculated.

Given the County's ongoing solid waste crisis, this should be calculated before the EA is approved. Options for waste disposal should be evaluated.

We support the maximum amount of recycling during construction and operation. We would like to see a written commitment to selling much more minimally packaged products and easily recyclable products as well. We also think that any new development should contribute cash funds to help the county accommodate the projected additional waste this project will bring

into our community.

p. 3-28 to 3-29 [traffic] mitigating measures recommended…

Kanoelehua Avenue-Puainako Street…major roadway improvements…

Kanoelehua Avenue-Makaala Street…longer traffic signal cycle lengths…

East Makaala Steet-Home Depot…Long delays for outbound left turn…

East Makaala Street-Prince Kuhio Mall driveway-Waiakea Center driveway: provide two through

lanes in each direction and study the need for traffic signalization…

Kanoelehua Avenue-Pohaku Street…The need for and impact of traffic signals should be

studied…

the impact from the proposed project is simply part of the whole dynamic created by development and mobility in this area…

Provide data to back up the final statement.

Shouldn't this level of traffic increase and road construction trigger an EIS? In light of the already very heavy congestion in the whole Puainako, Kuhio, Walmart, Home Depot area the County should consider redesigning the traffic flow in the whole area before this project is completed.

Perhaps frequent bus service between Puna, this area and downtown Hilo with tram-like service

around the whole Puainako and Kuhio Malls and this project and the Home Depot could eliminate

the needs for so many cars in this already congested area?

p. 3-25 to 3-29 Roads and Traffic

Plan for alternatives to cars--buses, taxis, mopeds, bicycles, skateboards, motorized and notarized wheelchairs, walking, etc. Plan bus stops, alternative transportation lanes that provide

safe and efficient routes, traffic patterns giving alternative transportation the right of way over

cars, etc. Plans must also include charging stations for the imminent plug-in hybrids and totally

electric cars Obama energy independence policies will bring to Hawaii in the near future.

p. 3-30 Health Care Services

This section should include information on the dire shortage of health resources on our island.

p. 3-30 to 3-31 DHHL…retained Group 70 International to conduct a Phase I Environmental Site

Assessment (ESA) of the project site…to provide an independent, professional opinion regarding

recognized environmental conditions…This study addresses the concerns of numerous state and

federal laws governing hazardous materials and toxic waste and their genesis, use, storage,

release, and disposal.

To provide an independent opinion, shouldn't a firm other than Group 70, which is doing the EA,

do the ESA?

p. 3-31 to 3-32…sampling data collected at the Hilo Wood Treating facility, the facility directly

north of the subject property, identified arsenic, chromium, copper, and hexavalent chromium in

the soil…

DOH documentation included a request to Hilo Wood Treating Company to inform adjacent property owners that past releases from the facility may have contaminated their property…Mr. Akana [of the current site tenant, Akana Petroleum]…stated that the lawyers of the parent company to Hawaiian Petroleum {Salchex Alaska} have the Phase II ESA document and that it has not been released to Mr. Akana…

[a Phase I ESA Report done by Will Chee Planning and Environmental says] Hilo Wood Treating complied with the EPA's enforcement action and covered the arsenic contamination areas with an asphaltic concrete cap; however the arsenic contamination still exists under the cap. There was some indication by the results of soil sampling that the proposed project site was impacted by operations at the Hilo Wood Treating facility.

Will Chee recommended an additional round of independent sampling for the property between

Hilo Wood Treating and the proposed project site to determine the full extent of surface soil

contamination and that the analysis should include tests for total Arsenic, Chromium, and Copper.

Based on analytical results from the soil sampling event, the report recommended that a course

of action be established to remediate the site and/or that a Human Health and Ecological Risk

Assessment be conducted.

No documentation was available to review regarding the completed Phase II ESA or the findings

of the additional sampling that may have taken place during the Phase II ESA…

The Hilo Wood Treating Site [immediately to the north] appeared to be down gradient from the

project site; however, during times of heavy storms it is assumed from the observed gradient that elevations on the proposed project site experience pooling water in the vicinity of the northern site boundary….

The Phase II ESA Document and its findings are recommended for obtainment by the future

developer…

The Phase II ESA should be obtained and evaluated during the EA process. Thorough assessment, and plans for cleanup, should be included in the EA--not done by the developer, as planned, with far less public scrutiny. The EA should evaluate whether the contamination triggers an EIS, Human Health and Ecological Risk Assessment, or other mechanism.

p. 4-1 permitted uses include…Agriculture products processing, minor…Community

buildings…Farmers markets…Food manufacturing and processing

Evaluate pros and cons of these alternatives in light of finite oil supplies, the global and local

economic crises, and climate change. These may all render our current model of importing 90%

of our food untenable, making sustainable local agriculture necessary for survival. There are

several Farmers' Markets in East Hawai'i--Hilo, Kinoole, Volcano, and the highly successful

Maku'u.

For the good of our local economy and to reduce the impact on the planet the new Safeway and Target as well as the rest of the big stores in the area should commit to giving preference to locally grown and manufactured products.

p. 5-3 Facility Systems--Energy

In the spirit of the 2050 Sustainable Plan, require solar and other carbon free electric, and designing for natural light and earth friendly ventilation/cooling, instead of electric lights and air conditioning.

p. 5-5 Sustainable development measures…are recommended..the United States Green Building Council…Leadership in Energy and Environmental Design…Green Building Rating System is suggested as a guide.

We support this.

p. 5-7 The proposed project has the potential to meet much of the intent of the 2050 Sustainable

Plan.

Two big box stores near several existing big boxes, increased traffic requiring more roadbuilding, increased sewage that may require a new sewer line, and unanswered questions about solid waste and chemical contamination, do not appear sustainable to us. Sustainable usecomments are under p. 4-1.

Kim Evans

From: Cory (Martha) Harden [mh@interpac.net]
Sent: Wednesday, February 04, 2009 10:28 AM
To: EastMakaalaEA; GVT STA HI DHHL Albinio; GVT STA HI OEQC
Subject: East Maka'ala EA

Draft Environmental Assessment

Department of Hawaiian Home Lands East Maka'ala Mixed Use Development

December 2008

Comments from

Cory Harden, PO Box 10265, Hilo, Occupied Hawaii 96721

808-968-8965 mh@interpac.net

p. 3-29 Public Services

Impact fees should be required, to fund fire, police, health care, and social services.

p. 3-16 At the time of this Act's [Hawaiian Homes Commission Act of 1920, giving DHHL stewardship of Crown Lands] passage, Hawai'i was a territory of the United States through a joint resolution passed by the U.S. government in 1898...

> *Note that "International law and the U.S. Constitution do not permit the annexation of the territory of a sovereign country without a lawful treaty of annexation. There was no treaty annexing Hawai'i to the United States, only a joint resolution of Congress claiming to accept the cession of Hawai'i to the U.S. by the illegitimate "Republic of Hawai'i", a government that the U.S. administration refused to recognize after the overthrow of the Hawaiian monarchy in 1893. Two attempted treaties of annexation put forth by the leaders of the illegal U.S. military-backed coup d'etat failed…**please provide proof of a lawful treaty transferring sovereignty from the Kingdom of Hawai'i to the U.S.** Domestic U.S. legislation is insufficient to acquire sovereignty over Hawaiian territory. In 1988, the U.S. Department of Justice could not determine how the U.S. annexed Hawai'i when it issued a memo that stated in part, 'It is therefore unclear which constitutional power Congress exercised when it acquired*

Hawaii by joint resolution. Accordingly, it is doubtful that the acquisition of Hawaii can serve as an appropriate precedent for a congressional assertion of sovereignty over an extended territorial sea.' [United States Department of Justice, Legal Issues Raised by Proposed Presidential Proclamation to Extend the Territorial Sea, Opinions of the Office of Legal Counsel, vol. 12, p. 238-263, October 4, 1988. Excerpts commenting on the annexation of Hawai'i taken from pp. 250 – 252] Thus a number of scholars of international law have concluded that proper status of Hawai'i is one of prolonged U.S. occupation. This would also mean that the U.S. does not have clear title to 'ceded' Lands." [Emphasis added. From comments by Kyle Kajihiro, American Friends Service Committee, Honolulu, on Draft EIS/OEIS for Hawai'i Navy Range Complex, September 15, 2007]

Note that the Draft Monument Management Plan for Papahanaumokuakea ,which was prepared in part by two Federal agencies, NOAA (National Oceanic and Atmospheric Administration) and U.S. Fish and Wildlife Service, says: "In 1893, Queen Lydia Lili'uokalani was overthrown by the self-proclaimed Provisional Government of Hawai'i, with the assistance of U.S. Minister John L. Stevens. Five years later, in 1898, the archipelago, inclusive of the NWHI, [Northwest Hawaiian Islands] was collectively acquired by the United States through a [U.S.] domestic resolution, [not a treaty between the U.S. and the nation of Hawai'i] called the 'New Lands Resolution.' "The ea (sovereignty and life) as well as the kuleana (responsibility), for the entire Hawaiian Archipelago continues to exist in the hearts and minds of many present-day native Hawaiians--a perspective recognized in law by the Apology Bill (U.S. Public Law 103-150), which is a joint resolution of Congress signed by President Clinton in 1993. The Apology Bill acknowledges the wrongful role of U.S. officers in the overthrow of the Kingdom of Hawai'i and apologizes to Native Hawaiians on behalf of the people of the United States' for the unlawful overthrow and the 'deprivation of the rights of Native Hawaiians to self-determination.' It also recognizes that 'the health and well-being of the Native Hawaiian people is intrinsically tied to their deep feelings and attachment to the land." (p. 45)

GROUP 70
INTERNATIONAL

PRINCIPALS

Francis S. Oda
Arch.D., FAIA, AICP

Norman G.Y. Hong
AIA

Sheryl B. Seaman
AIA, ASID

Hitoshi Hida
AIA

Roy H. Nihei
AIA, CSI

Ralph E. Portmore
AICP

James I. Nishimoto
AIA

Stephen Yuen
AIA

Linda C. Miki
AIA

George I. Atta
AICP

Charles Y. Kaneshiro
AIA, LEED AP

Jeffrey H. Overton
AICP, LEED AP

Christine Mendes Ruotola
AICP

James L. Stone
AIA, LEED AP

Paul Bierman-Lytle
M. Arch., AIA, LEED AP

Katherine M. MacNeil
AIA, LEED AP

Tom Young
AIA

April 2, 2009

Ms. Cory Harden
Moku Loa Group
Sierra Club
P.O. Box 1137
Hilo, HI 96721

Re: Draft Environmental Assessment
DHHL East Maka'ala Mixed Use Development
TMK (3) 2-2-047:072, Hilo, Hawai'i

Dear Ms. Harden,

Thank you for your comment emails dated February 4, 2009 regarding the Draft Environmental Assessment (DEA) for the DHHL East Maka'ala Mixed Use Development. We offer the following in response to your comments.

We acknowledge your support for projects intended to generate revenue for the Department of Hawaiian Homelands, as this project is intended to do. We also appreciate your support of some of the suggested development practices for the proposed project, including landscaping with native plants, measures to minimize light pollution, recycling where practicable, and sustainable stormwater and green building practices. With regard to the concerns you have expressed, we respectfully provide the following responses.

1. Climate

Human impact on climate change is a complex issue. Many factors contribute to it, and it is impossible to address all of them. We respond specifically to the issues you have raised.

We are aware of the dearth of locally sourced building materials and that there are important greenhouse gas emissions issues associated with construction in the state of Hawai'i. Such concerns include shipping and production costs of the materials used. DHHL will encourage green building techniques and materials selection in our negotiations with our prospective developers.

The increased heat island effects you mention due to large roof surfaces, parking lots, and road surfaces are well known phenomenons. Mitigation includes the planting of vegetation, the use of colors, surfaces and materials that have a high albedo coefficient and other designs that minimize heat gain where practicable. Other measures include sustainable stormwater management practices such as reducing paved surface areas through vegetated swales and bioretention areas. These issues will be discussed with the proposed developers of the site.

A no-action alternative will avoid these concerns but does not meet the needs of the department for revenue generation. The potential for alternative development options especially related to agricultural uses you mention in your

Group 70 International • 925 Bethel Street, 5th Floor • Honolulu, HI 96813-4307 • tel. 808.523.5866 • fax. 808.523.5874 • www.group70int.com

letter (as outlined below in item 2) is reviewed further in the final environmental assessment.

2. Alternative Uses Related to Food Security
Your concern regarding food security in the state of Hawai'i is noted. The subject site is already heavily impacted by neighboring and past uses and is not optimal for food propagation. Although at one time the site was designated for agricultural use, it has been designated as State urban for a long time. The SCS soil classification identifies the soil as Pāpa'i stony clay muck which is considered poor for topsoil with fragmented 'a'ā lava at depths of less than 10 inches. While agriculture is possible, this is not prime agricultural land. The Pana'ewa Regional Plan designates the site as an Industrial/Commercial development area.

The proposed development site is not adjacent to agricultural uses, making it an unlikely candidate for alternative uses related to agriculture, including agricultural products processing, minor; farmers markets; and food manufacturing and processing, as mentioned in your letter. We note that the comprehensive Hilo Farmers Market is open all day on Wednesdays and Fridays.

Other DHHL land is available for agricultural uses in the vicinity. Pana'ewa Farm Lots, south of the proposed project area, is an area comprised of 285 parcels encompassing 1,615 acres zoned for agriculture and requires tenants to engage in agricultural activities on their lots.

The issue of food security is not related to the availability or lack of farm land. It has more to do with the economics of farming which are more closely related to land costs, availability of infrastructure, issues of scale and market competitiveness. We do not feel this site is critical to any of those issues.

3. Potable Water
The State Department of Health's (DOH) Underground Injection Control (UIC) line is intended to protect drinking water from potential contamination from injection well activity. Aquifers above the UIC in elevation are protected, and there are maps for each island of Hawai'i defining the UIC line. Though the groundwater below the site is identified as a currently used fresh drinking water source, the aquifer is not protected as a drinking water source by the State because of its elevation location. There is no contradiction in the statement that the same aquifer is protected for water use above the UIC line while at the same time injection is allowed below the line. Groundwater in aquifers generally flows with gravity in a down gradient. The UIC line recognizes this fact, and the line is located in a place below which groundwater is not used for potable purposes.

You question the noted possible positive impact of the proposed development regarding the elimination of potential pollution of groundwater resulting from

current industrial tenant activities. To further clarify, the current tenants are engaged in industrial activities with greater chance of stormwater runoff pollution than the proposed tenants' mixed-use commercial activities. Continuation of present activities is more likely to result in groundwater contamination than the development of retail commercial businesses.

4. Flora
The conclusions regarding flora are drawn from observations made by Group 70 International Staff experienced in botanical identification. The site is already heavily impacted from past uses and grading. Given the level of scrutiny required for an Environmental Assessment, field observations, the supporting data from botanical surveys conducted for areas adjacent to the proposed project site, and the impacted conditions of the site, we do not believe a supplemental botanical survey is required. Rather, we recommend retention/replanting of the few culturally significant 'ōhi'a lehua and landscaping with native vegetation which may, as your letter notes, contribute to stormwater retention and possibly mitigate some impacts due to climate change.

5. Lighting
The same efforts to minimize light pollution will minimize impacts on birds and visibility for the Mauna Kea observatories, as noted in section *3.1.7 Fauna*. We appreciate the support for these suggested measures.

6. Economic and Market Considerations
The Safeway and Target stores are conceptual stores still in the planning and early design stages. Quantifying "how many new products will be offered compared to existing stores nearby" is not possible. It is likely that some products will be the same as what other stores offer, but these stores, especially Target, will also offer their own unique brands of merchandise. We acknowledge your recommendation to give preference to locally grown and manufactured products and will suggest this to the proposed retailers.

We include the mention of spending of retirees/second home owners and the underground economy in the Hilo area in the *Economic Impacts* section to include as much information in the report as possible. However, the contributions to the economy by these two factors do not change the assumptions and conclusions of this Environmental Assessment because they are not significant enough to change overall demographic assumptions. We also note that quantifying economic activity due to underground economies is extremely difficult because they are underground.

The land use and market analysis is the best available information for evaluating social and economic impacts for this proposed development. Given the uncertainty of market behavior, we are unable to predict how current market trends might affect the available market study's assumptions and conclusions. While it is possible some businesses might fail, overall income levels in this area of Hilo should support value retail merchandise offered at Target and similar

retailers. In the event large retail spaces become available, we encourage Hawai'i County to facilitate re-use of these buildings.

Land use decisions are made with long term goals in mind and market fluctuations may affect the timing but generally not the validity of land use decisions. While we agree that the current economic situation is serious, its very unprecedented nature makes any projection suspect, including the alternatives you suggested in your comment letter. There is clearly increased risk but response to economic risk is a landowner's or developer's prerogative. Land use designations and regulatory decisions set the framework for that risk. They do not determine the implementation of the decisions.

7. Wastewater
Full disclosure of knowledge to date regarding wastewater capacity in the vicinity of the project is made in this DEA. More detailed designs will be developed at a later phase of project development.

The study the County plans to conduct regarding sewer line infrastructure will determine the sewer system layout for the proposed project. We anticipate that this study will include considerations of all projected growth in the area. We feel there is no need for deferral of the proposed action until the comprehensive plan is completed, because regardless of what is disclosed or stated in the EA, building permits will not be issued if there is inadequate capacity in the wastewater system. This potential risk is the developer's risk.

8. Stormwater
We appreciate and acknowledge the support of the sustainable stormwater mitigation suggestions in the DEA.

9. Solid Waste
While the amount of solid waste generated from the proposed project has not been calculated, volumes will be similar to those resulting from operations typical of Safeway and Target stores. Suggestions to reduce waste by selling products with minimal packaging and/or that may be easily recycled are noted. It is beyond the scope of the Environmental Assessment to determine conditions of development such as fees to handle waste.

Recycling and reuse of construction waste will be encouraged.

10. Traffic
As outlined in the *Appendix C Traffic Impact Assessment Report*, the traffic forecast takes into account both projected population growth for South Hilo and the projects being considered in the vicinity of the proposed development.

The County of Hawai'i Police Department wrote in response to the traffic impact assessment, "It is our view that the mitigation measures proposed within Section 3.3.5 *Roads and Traffic* of the Draft Environmental assessment are adequate,

except for the measures being proposed for the…intersection [providing vehicular access into Prince Kuhio Plaza and Waiakea Center at the west end of Maka'ala Street]." We respect the opinion of the Hawai'i Police Department, and accordingly sent their suggestion for providing traffic signalization and related improvements for this intersection to our traffic engineers for consideration and possible revision for the Final Environmental Assessment (FEA).

The State Department of Transportation (SDOT) had many concerns regarding traffic impacts from the proposed project. The Traffic Impact Analysis Report (TIAR) has been revised to incorporate the SDOT's concerns regarding traffic volumes and safety. Additionally, an increase in store volume not considered in the original TIAR is part of the revised TIAR analysis. The resulting additional mitigation recommendations included in the FEA include traffic signalization and additional turn lanes.

Though the proposed project is expected to generate a sizeable number of trips, we do not believe this level of traffic increase and road construction requires an EIS, based upon similar adjacent development, notably the Home Depot, which required an EA. We leave that decision to the accepting authority for this DEA. We also note that the actual number of trips generated in the future may be lower than what is forecast by the traffic analysis, based on evidence that the Home Depot store is not generating as many trips as forecast using the *Trip Generation* report, as explained in *Appendix C*.

We acknowledge your suggestion for improved bus routes, but mass transit service improvements are within the County's purview and are thus a matter for public policy to determine. At this point, plug-in hybrids are not readily available on Hawai'i Island, though we agree that they may be coming. We suggest consideration of including charging stations at the proposed project at the appropriate time, which may be marked by demand warranting installation. Basic provisions for other alternative means of transportation you mention, such as walking, bicycles, mopeds, skateboards, and wheelchairs, will mostly be accommodated by sidewalks and handicap accessibility considerations included in the design of the proposed project. While many of your suggestions are worthwhile, most go beyond both the scope or impact of our project. We think they are broader public policy issues that should be raised in another forum.

11. Air Quality
Air quality in the Hilo region is impacted by other larger causes well beyond our project. Vog and wind direction are the overwhelming causes for air quality in the area. Air pollution in the Hilo region is generally limited and is typically diffused by trade winds. Activities from the proposed development during construction and operation phases are not expected to significantly impact air quality above state and federal air standards. We do not believe a study quantifying air pollution level changes caused by the proposed development is necessary.

12. Health Care
The section on public services, including Health Care, is largely intended as an assessment of emergency services available to the proposed development. The assessment is primarily to review the locational aspect of the project from existing and future health and emergency services with respect to availability and response time. In this regard project impact is not considered significant.

While the shortage of health care resources in Hawai'i County may be a concern, because this project will largely serve the existing population, we do not think the proposed development will create any additional undue strain on the health care system. Rather, it is anticipated that the existing health care facilities are adequate for any of the occasional and unavoidable health care needs resulting from the construction and operation of this proposed project.

13. Phase I and II Environmental Site Assessments
Group 70 International is as unbiased as any other consultant that might be hired by Department of Hawaiian Homelands to conduct a Phase I Environmental Site Assessment (ESA), and we are committed to full disclosure of any findings of such a study, as evidenced by the discussion in *3.4 Hazardous Materials*.

We appreciate your support for our recommendation that the Phase II ESA and its findings should be obtained in order to identify whether the lateral and horizontal extent of contamination includes the project site and to determine best management practices in terms of remediation, containment, and disposal during the construction and operational life of the proposed development. The difference in opinion is when this should happen. Your request that the information should be included in the EA is essentially based on a request for transparency and chance for public input and disclosure. We agree that the community has every right to know about pollution in its vicinity, and recommend that the developers, Department of Hawaiian Homelands, and the County make a concerted effort to notify the public of the findings of the Phase II ESA and any resulting remediation measures.

14. Energy and Sustainable Development
Your suggestion to include low energy use lighting and cooling considerations in the proposed development is captured in the OEQC *Guidelines for Sustainable Building Design in Hawai'i: A Planner's Checklist*, included in the DEA and FEA, as is your support for the use of the Green Building Rating System as a guide to meet the goals of the 2050 Sustainable Plan. We acknowledge your opinion that the project as proposed does not meet your standards for sustainability, but we believe that if all recommendations in the FEA are followed and appropriate mitigation measures are employed, the potential for this project to meet much of the intent of the 2050 Sustainable Plan remains.

15. Public Services
We acknowledge your suggestion that impact fees should be required to fund fire, police, health care, and social services. However, this suggestion is a matter for public policy.

16. Apology Bill
We recognize your concerns regarding the transferring of land title in Hawai'i. We are not able to provide proof of a lawful treaty transferring sovereignty from the Kingdom of Hawaii to the U.S as requested. We can, however join you and others in supporting that the ea (sovereignty and life) as well as the kuleana for the entire Hawaiian Archipelago continues to exist in the hearts and minds of many present-day native Hawaiians – a perspective recognized in law by the Apology Bill. The excerpt you provided from the Draft Monument Management Plan for Papahanaumokuakea regarding the overthrow in 1898 is a useful way of describing that situation. Thank you.

We appreciate your participation in the environmental review process.

Your comments and this response will be included in the Final EA. We will send you a copy of the Final EA.

If you have any questions, please feel free to contact me at 808-523-5866 ext. 134.

Sincerely,

GROUP 70 INTERNATIONAL. INC.

Kim Evans
Planner

cc: DHHL, OEQC

8.0 REFERENCES

8.0 LIST OF REFERENCES

Baker, H.L. et.al. *Detailed Land Classification, Island of Hawai'i.* Land Study Bureau, University of Hawai'i. 1965.

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APPENDIX A. CIVIL REPORT

DRAFT

PROJECT ASSESSMENT REPORT

FOR

DHHL EAST MAKA'ALA MIXED USE DEVELOPMENT

TMK: (3) 2-2-047:059, Lot 5-A-1
District of South Hilo
Island of Hawaii

Prepared for:
State of Hawaii
Department of Hawaiian Home Lands

Prepared by:
Okahara and Associates, Inc.

October 15, 2008

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SECTION 1: INTRODUCTION

1.1 Project Background & Location

The Department of Hawaiian Home Lands (DHHL) is seeking to enter into a general lease agreement for the construction, operation and management of an industrial/commercial mixed-use development and related facilities on a 15.5-acre parcel of Hawaiian Home Lands (known as the East Maka'ala Mixed Use Development). TMK parcels (3) 2-2-047: 059, 067, 068 and 071 will be consolidated and subdivided into two lots. The project site will be identified as TMK (3) 2-2-047: 059, Lot 5-A-1, which is the result of the consolidation of parcels 067, 068, and 071. The East Maka'ala Mixed Use Development site is located at the corner of East Maka'ala Street and Railroad Avenue in South Hilo, Hawaii Island. Surrounding structures include a Wal-Mart store and a Home Depot store. The existing area is fairly level with a number of older industrial structures, and appears to have been cleared and graded in the past. It was recently used as a temporary base yard during the construction of the nearby Home Depot store. See Figure 8.1 for an overall site plan and location map.

1.2 Purpose and Overview of Report

The purpose of this project assessment report is to provide the Department of Hawaiian Home Lands with the technical and cost information necessary to determine the feasibility of proceeding with the proposed improvements. Information contained herein is for planning purposes only and should be considered preliminary. Should DHHL decide to proceed with this project, a more detailed engineering design analysis should be performed to determine the final scope and cost of the improvements.

As part of the preliminary engineering design analysis, the following proposed improvements for the development were evaluated in the subsequent sections of this report:

- General site layout (parking lot, building, service lane, etc.)
- Drainage alternatives that handle stormwater runoff sufficiently
- Water service
- Sewer service
- Electrical service
- Estimated cost of the proposed improvements

SECTION 2: GENERAL SITE LAYOUT

The proposed development includes a 180,000 square foot building, a parking lot with approximately 683 parking stalls, and a loading dock and service lane for loading and unloading. See Figure 8.1 for an overall site plan.

2.1 Main Parking Lot

The main parking lot is located at the southern edge of the project site. The lot includes 669 standard parking spaces, 14 handicap accessible parking spaces, curbed islands, 2 driveways accessing East Maka'ala Street, and 1 driveway accessing Railroad Avenue. The parking lot will complies with Chapter 25 of the Hawaii County Code, 2005 edition. The materials used for this parking lot will either be 2 inches of asphalt concrete (A.C.) pavement over 6 inches of base course or a permeable surface course over a uniformly-graded stone bed, depending on which drainage alternative is chosen for the project (see Section 3 for more information).

2.2 Building Area & Service Lane

The 180,000 square foot building is placed directly north of the main parking lot. The distance between the building and the property lines meet the requirements set forth in the Hawaii County Code. Attached to the building are a concreted stock area and loading dock. A service lane connects a driveway accessing Railroad Avenue to the loading dock, building, and 14 additional standard parking spaces. The service lane turnaround area is adequate for the 45-foot turning radius of a fire truck. The materials used for the service lane and connected parking area will match what is used in the main parking lot.

2.3 Landscaping

The remainder of the proposed development will be landscaped in accordance with the Hawaii County Code. This includes installing topsoil, grassing, and planting the required trees and shrubbery. The curbed islands within the main parking lot will be grassed and planted as well. Native plants are recommended for this site.

SECTION 3: DRAINAGE

3.1 Drainage Analysis

Drainage analysis for this project assessment included determining the amount of off-site stormwater flowing onto the project site, calculating the difference between on-site pre and post-construction runoff, and finding suitable options for handling the excess runoff. The following sections explain the process and procedures followed to evaluate the project site drainage, and possible alternatives to handle the project stormwater.

3.1.1 Off-Site Runoff

USGS map contours in the vicinity of the project area indicate that near the site, runoff flows in a northerly direction. This would mean that the only off-site runoff possibly affecting the project site would need to flow across East Maka'ala Street onto the site. It was assumed that the 10 existing catch basins and modified catch basins/drywells along the section of East Maka'ala Street bordering the project site adequately handle any stormwater that flows onto the road. Therefore, based on the USGS topographic map of the project area and the existing drainage structures, it was assumed that no off-site stormwater flows onto the site. See Figure 8.2 for off-site flow based on USGS

topographic map contours, and Figure 8.3 for locations of the existing drainage structures.

3.1.2 On-Site Runoff (Pre and Post-Construction)

The County of Hawaii Storm Drainage Standards dated October 1970 was referenced when performing the drainage calculations. Since all drainage areas were less than 100 acres, the rational method was utilized when calculating runoff for the project site. The rational method utilizes the following formula:

$$Q = CIA$$

Where Q = flow rate (cfs)
C = runoff coefficient
I = rainfall intensity (in/hr)
A = drainage area (acre)

The recurrence interval for drainage areas of 100 acres or less is T_m = 10 years. A runoff coefficient value of 0.9 was used for impervious areas such as the asphalt parking lots and concrete loading dock and stock area. A value of 0.95 was used for the impervious roof of the building. When calculating pre-construction runoff, the entire site was taken as one tributary area. For post-construction runoff calculations, the site was broken into three areas: the main parking lot, the building, and the remaining site. See Sections 9.1 and 9.2 of the Appendix for the on-site pre and post-construction drainage calculations. Based on the attached calculations, the difference between on-site pre and post-construction runoff was about 100 cfs (pre-construction runoff was 25 cfs, while post-construction runoff was 125 cfs).

3.2 Drainage Alternatives

3.2.1 Drainage Alternative 1: Drywells

One possible option for managing site stormwater is the installation of drywells throughout the proposed development. If this option is chosen, a total of nineteen 20-foot deep drywells are recommended throughout the project site. Since a 20-foot deep drywell has an estimated capacity of 6 cfs, the nineteen proposed drywells will be sufficient to handle the approximate 100 cfs of excess runoff resulting from the development of the site. Twelve drywells would be placed within the main parking lot area, and seven drywells would be placed around the building. See Section 9.2 of the Appendix for drywell calculations, and Figure 8.4 for a proposed drywell location map.

Additional drainage measures to facilitate drywell stormwater management include constructing swales within the main parking lot, installing downspouts on the building, and site grading to direct runoff either into the appropriate proposed drywells or off the site in the natural direction of flow. The parking lot swales should be designed with adequate capacity while also having minimal slopes (<2%) so that the parking lot can be kept fairly level. With this in mind, a generic parking lot swale was designed to check that the required dimensions fit within the available space. Since the purpose of the

swale is to direct stormwater into a drywell, it was assumed that the maximum amount of flow the swale must hold is the capacity of the drywell (6 cfs). Based on the swale calculation, a swale width of 21 feet is needed to handle about 6 cfs of runoff. This swale will fit within the lanes between parking stall rows without encroaching into the actual stalls. See Section 9.3 of the Appendix for the swale width calculation. For building rooftop runoff, downspouts will be used to direct stormwater into one of the seven drywells around the building. The remaining site area can be graded so that stormwater flows either into a proposed drywell, or in a northerly direction off of the site (natural direction of flow). See Figure 8.4 for the parking lot swale locations and dimensions, and general stormwater flow throughout the site.

3.2.2 Drainage Alternative 2: Pervious Pavement

Another option for managing stormwater is the use of pervious pavement in the project's parking lots, service lane, loading dock and stock area. Several drywells would most likely still need to be installed to handle building roof runoff, but the number would be less than that of drainage alternative 1. This pervious pavement method has not been used much in Hawaii. Based on preliminary research, there are many variations of pervious pavement, including porous asphalt, pervious concrete, and permeable paver blocks. Most of these pervious pavements appear to be designed with an overflow control structure in case of a large storm event. See Section 9.4 of the Appendix for an example of typical sections of various pervious pavements, and a sketch of the overflow structure. Because of the lack of projects using pervious pavement in Hawaii and the apparent variety of pavement types, a study would be recommended prior to selecting this drainage alternative.

SECTION 4: WATER

4.1 Existing Water System

Existing waterlines run along both streets that the proposed East Maka'ala Mixed Use Development site fronts. The existing 8-inch waterline that runs along East Maka'ala Street connects to a 12-inch waterline running along Railroad Avenue. At the intersection of Railroad Avenue and Fern Street, the waterline is reduced from a 12-inch to an 8-inch line. This 8-inch waterline continues in a northerly direction along Railroad Avenue from the Fern Street intersection.

Existing waterline appurtenances near the project site are listed in Table 4.1.1 below. Note that only the appurtenances on the road side closer to the site were counted (this would be the mauka, or west, side of Railroad Avenue and the north side of East Maka'ala Street). See Figure 8.3 for the existing waterline layout and locations of existing appurtenances. Two of the existing fire hydrants along Railroad Avenue are close enough to the proposed building to be of beneficial use to this project. None of the existing service laterals can be of use to the proposed development because they are of insufficient size (see subsequent sections for waterline sizing). A benefit the existing service laterals do provide is credit to be used toward the proposed development's water

facilities charge. See Section 7 of this report for a more detailed description of the credit accumulated from the existing water meters.

Table 4.1.1: Existing Waterline Appurtenances

	Number of Fire Hydrants	Number of 1" Type A service laterals (1 meter each)	Number of 1-1/4" Type C service laterals (2 meters each)
East Maka'ala Street	2	1	4
Railroad Avenue	3	1	1

4.2 Proposed Water Demand and Fire Flow Requirements

At the time this report was written, there were no available detailed drawings with fixture units to calculate this project's specific water demand. Instead, acceptable demand levels were obtained from the domestic consumption guidelines in Table 100-18 of the State of Hawaii Water System Standards dated 2002. This development is zoned as Commercial/Industrial Mixed Use, and since the Water System Standards have no guideline available for this zone on the island of Hawaii, the island of Oahu guideline was used. The Oahu guideline for average daily demand is 100 gallons per 1,000 square feet (sq.ft.). The proposed building on-site has an area of 180,000 square feet. Using this information, water demand for the proposed development was calculated:

180,000 sq.ft. x (100 gallons/1,000 sq.ft.)/day = 18,000 gallons/day

In order to check the practicality of this demand rate, it was compared to the measured demand rate of the Costco building in Kona, Hawaii Island. Costco's average daily demand from the beginning of 2005 to the end of 2006 was 18,267 gallons/day (see Section 9.5 of the Appendix for Costco's water usage history); therefore, 18,000 gallons/day is believed to be a reasonable water demand rate for the proposed development.

The fire flow requirements for an industrial development on the island of Hawaii are 2,000 gallons per minute (gpm) for 2 hours (Table 100-19 of the Water System Standards). However, according to the Fire Department, since the proposed building encompasses a significant area the flow requirement can be lowered to 1,500 gpm if the entire building has a sprinkler system per NFPA 13 standards. See Section 9.6 of the Appendix for the Fire Department email regarding this matter.

4.3 Proposed Waterline Sizing and Layout

Based on the calculated water demand rate, the modified fire flow requirement, and Water System Standards sizing guidelines, the proposed waterline was adequately sized. Due to the reduced fire flow requirement of 1,500 gpm, an 8-inch waterline is sufficient for the proposed development. The proposed waterline will connect to the existing 8" waterline along Railroad Avenue and will run along the north, east, and south sides of the

proposed building. In addition to the two existing Railroad Avenue fire hydrants that can be of use to the site, six new fire hydrants will be installed along the new waterline at spacing intervals meeting the requirements set in Table 100-19 of the Water System Standards. See Figure 8.5 for a map of the proposed waterline layout.

SECTION 5: SEWER

5.1 Existing Sewer System

The closest existing sewerline to the proposed development site is an 8-inch sewerline running along East Maka'ala Street. This sewerline ends at the west entrance to Home Depot (entrance closest to Kanoelehua Avenue/Volcano Highway), where it connects to the Home Depot site. The rest of the existing sewerline runs west along Maka'ala Street, crosses Kanoelehua Avenue, then runs in a northerly direction through Hilo's Industrial Park area and some residential properties. The sewerline changes from an 8-inch to a 12-inch line, and at Leilani Avenue, the sewerline increases to a 36-inch line. See Figure 8.3 for the location of the existing sewerline near the site.

5.2 Pending Proposals for Sewer System

The County of Hawaii Department of Public Works is unsure if the existing sewerline described above can handle additional discharge. No calculations from past projects are available from the County at this time. Prior to planning any sewerline connections, the county proposes to have a study performed on the existing sewerline up until the crossing at Leilani Avenue based on actual water usage rates. Their concern is that although these average daily flow rates do not appear to be a problem, the calculated design peak flow may be over the capacity of the existing sewerline (the capacity of a sewerline must be able to handle the design peak flow). The calculation of the design peak flow (using the Department of Wastewater Management Design Standards dated July 1993) incorporates the use of the Babbit flow chart, which can increase the average daily flow rate by up to a factor of 5. This increased rate is added to any infiltration/inflow rates, and the result is the design peak flow value. This sewer study is considered to be a project in itself that could take several months.

Another proposal by the County of Hawaii is to construct a new sewerline running northerly along Railroad Avenue until the intersection at Leilani Avenue. The sewerline would continue westerly along Leilani Avenue, cross Kanoelehua Avenue and connect to the existing 36-inch sewerline previously described. This proposal is to be discussed between the Department of Water Supply and the Department of Hawaiian Home Lands. A potential problem for this proposed sewerline is a dip in the road along Railroad Avenue. If the proposed sewerline is to be gravity-fed, the pipe invert elevations must not be lower than that of the proposed connection point. However, the road dip along Railroad Avenue may force a lower elevation than desirable for the sewerline at the dip, and consequently may cause a problem when trying to connect to the existing 36-inch line.

Presently, the proposals described above need to be further discussed. As a result, this report does not include a sewer system layout for the proposed development.

SECTION 6: ELECTRICAL

6.1 Off-Site Electrical Improvements

The Electric service provider for this project will be Hawaii Electric Light Co. (HELCO). Based on discussions with HELCO's representatives, a new substation is anticipated to be required for the proposed project. HELCO's preference is a new site fronting Railroad Avenue within 1 to 2 miles of project site. The minimum size of a utility easement to HELCO is 150 feet by 150 feet.

6.2 Off-Site Telephone/CATV Improvements

The Telephone and Cable TV service provider will be Sandwich Isle Communications (SIC). A "central office" type facility for SIC is located on Railroad Avenue across from project site. Adequate service capacity should be available from existing underground infrastructure on Railroad Avenue.

6.3 On-Site Improvements

An underground infrastructure system for Electric and Telephone/CATV services is recommended for Building 1 and for Building 2. Refer to Figure 8.6 for suggested routing. The infrastructure system will consist of "empty" concrete encased ductlines and handholes. Concrete pads for HELCO's equipment and transformers will also be required.

HELCO and SIC will provide the "cabling" in the infrastructure system. Cost of "cabling" will be at developer's expense.

6.4 Lighting For Exterior Areas/Parking Lots

Lighting standards are required to be low pressure sodium lamp sources to comply with the Hawaii County Outdoor Lighting Ordinance.

SECTION 7: PROJECT COST

7.1 Pervious Pavement Costs

Drainage alternative 2, which calls for the use of pervious pavement, is not included in the cost estimate for this project. As stated in Section 3, little is known about pervious

pavement in Hawaii, including the costs. If this drainage alternative is chosen, a cost estimate should be part of the pervious pavement study that was recommended.

7.2 Water Facilities Charge

As stated in the Section 4 of this project assessment report, the existing service laterals associated with the project site will provide credit toward the development's water facilities charge. According to the County of Hawaii Department of Water Supply, a credit of $5,500 will be given for each of the 12 existing water meters situated to service the proposed development, and a credit of $1,190 will be given for each of the three existing lots being consolidated into the proposed development. The water facilities charge for the site is $5,500 per unit; a unit is defined as a lot with a water demand of 400 gallons/day. With this information, the final water facilities charge was calculated below.

Existing Water Meters: ($5,500/meter) x 12 meters = $66,000
Existing Lots to Be Consolidated: ($1,190/lot) x 3 lots = $3,570
Total Credit: $66,000 + $3,570 = $69,570

Number of Units on the Development: (18,000 gal/day)/(400 gal/day/unit) = 45 units
Water Facilities Charge: 45 units x ($5,500/unit) = $247,500

Final Water Facilities Charge: (Charge) – (Credit) = $247,500 - $69,570 = $177,930

7.3 Electrical Costs

The cost of the electrical portion of this project is listed as a lump sum item in the attached preliminary cost estimate (Section 9.8 of the Appendix). Below is a summary that provides further description of the electrical work costs. For a detailed breakdown of the electrical pay items, see Section 9.7 of the Appendix.

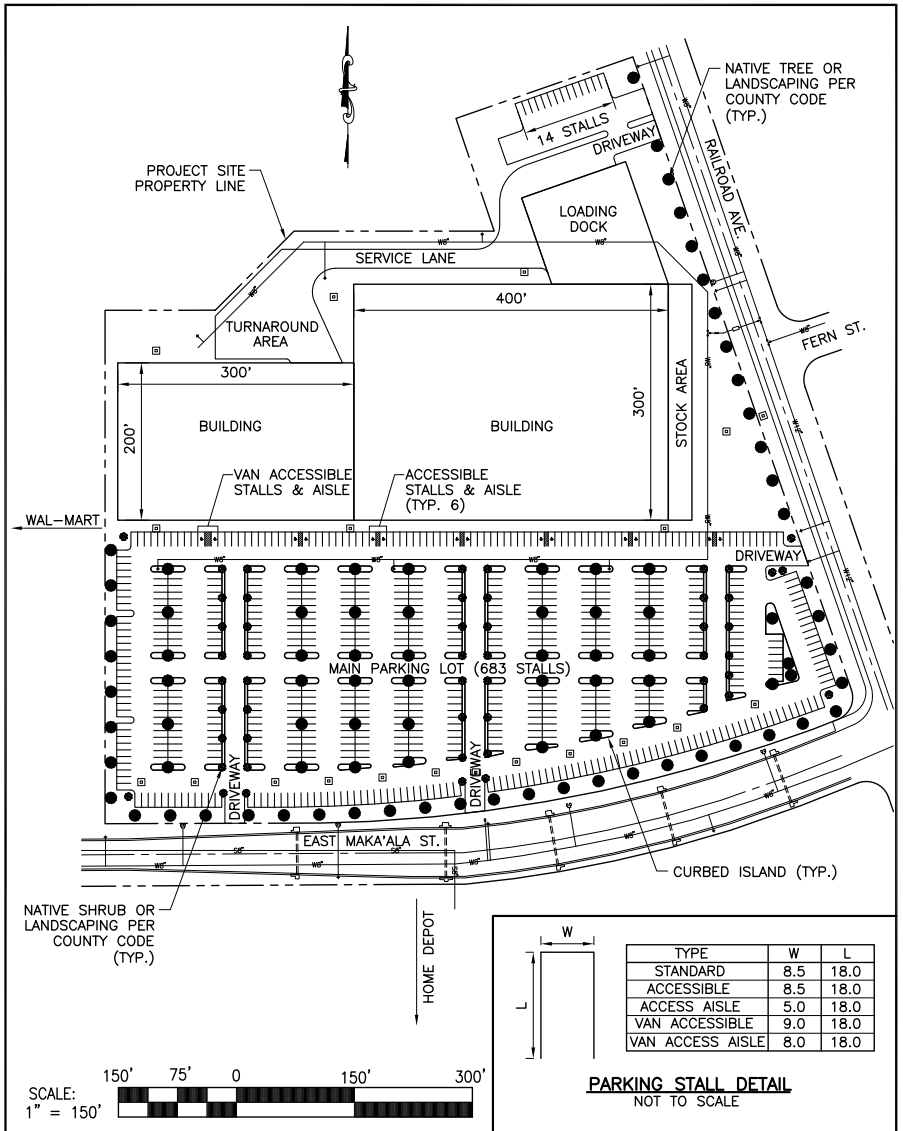
Table 7.3.1: Electrical Pay Item Summary

ELECTRICAL SUMMARY ITEMS	COST
Underground infrastructure for electric/telephone/CATV utilities, & Lighting for exterior/parking areas	$1,296,212
Building "1" (60,000 s.f. building area)	$1,200,000
Building "2" (120,000 s.f. building area)	$1,920,000
HELCO fees	$1,950,000
SIC Fees	$50,000
TOTAL:	$6,416,212

7.4 Total Project Cost

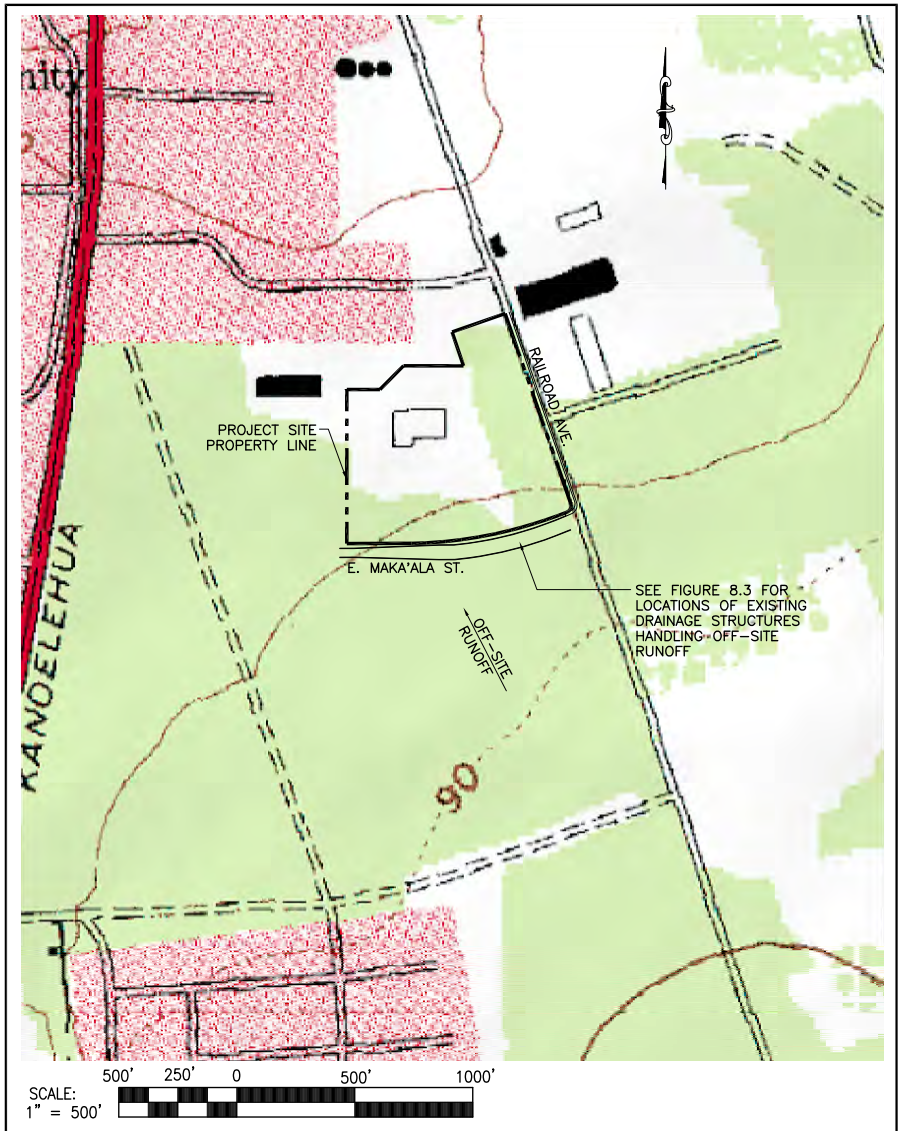
Based on the preliminary site design described in the previous sections of this report and the explanations in Sections 7.1 through 7.3, a total construction cost of $12 million is estimated for this project. See Section 9.8 of the Appendix for the preliminary cost estimate with a breakdown of the pay items.

SECTION 8:
APPENDIX OF FIGURES



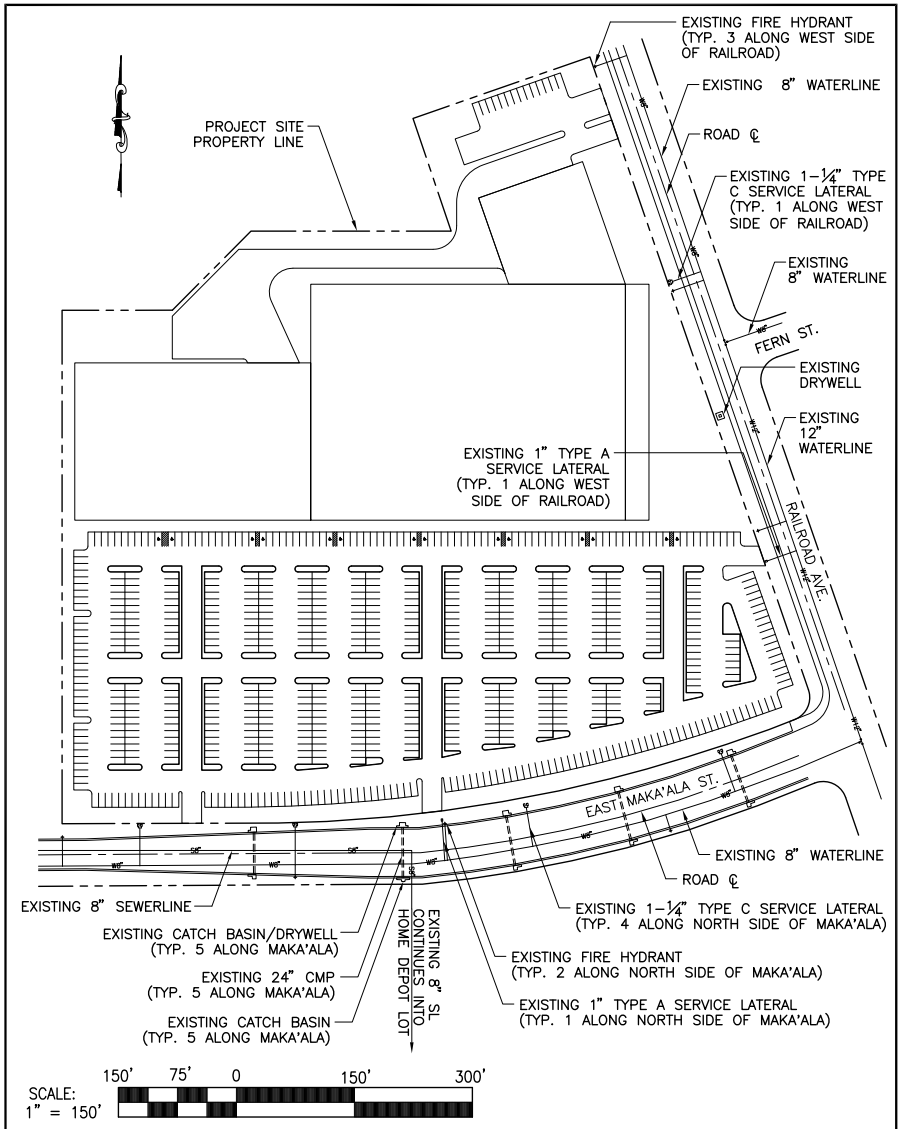
Department of Hawaiian Home Lands
East Maka'ala Mixed Use Development
Hilo, South Hilo, Hawaii Island
TMK: (3) 2-2-047: 059, Lot 5-A-1

Project Assessment Report
Figure 8.1:
Overall Site Plan & Location
Sheet 1/1, 10/15/08



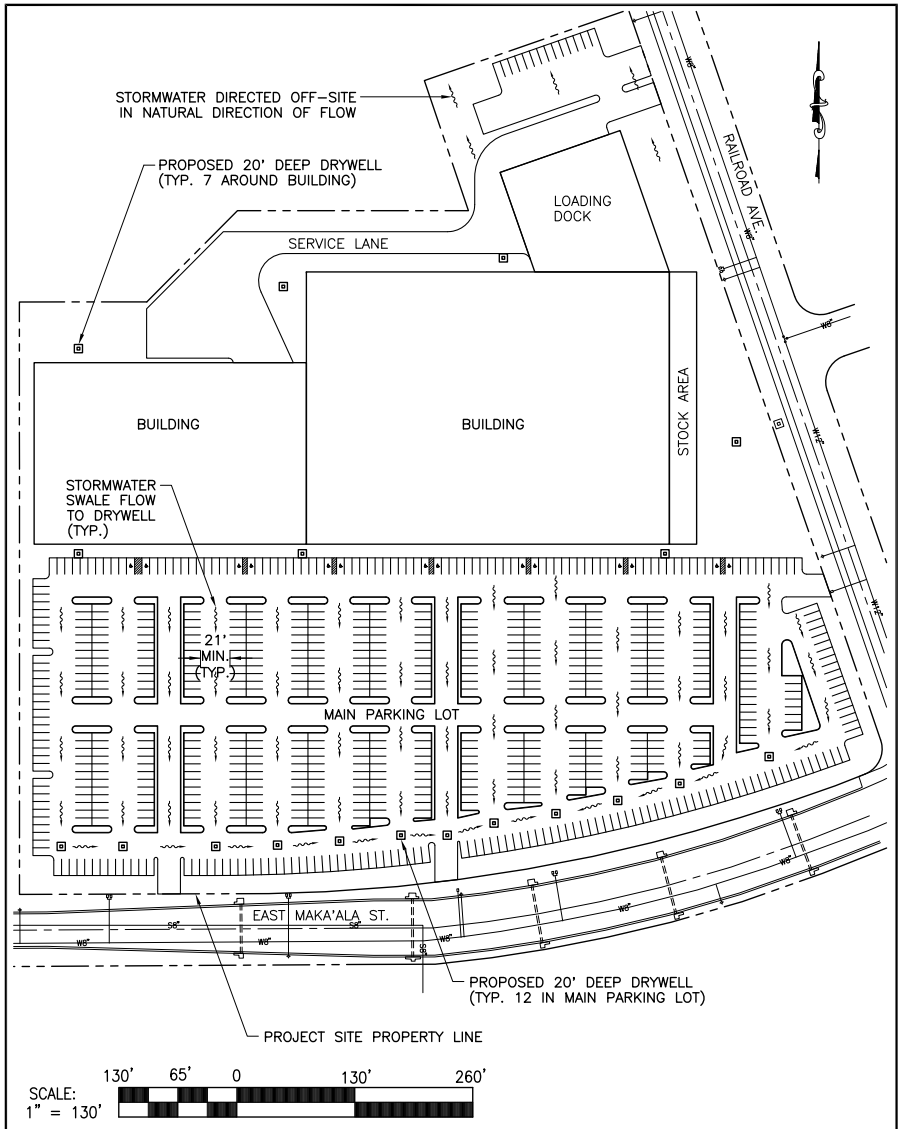
Department of Hawaiian Home Lands
East Maka'ala Mixed Use Development
Hilo, South Hilo, Hawaii Island
TMK: (3) 2-2-047: 059, Lot 5-A-1

Project Assessment Report
Figure 8.2:
Off-site Runoff
Sheet 1/1, 10/15/08



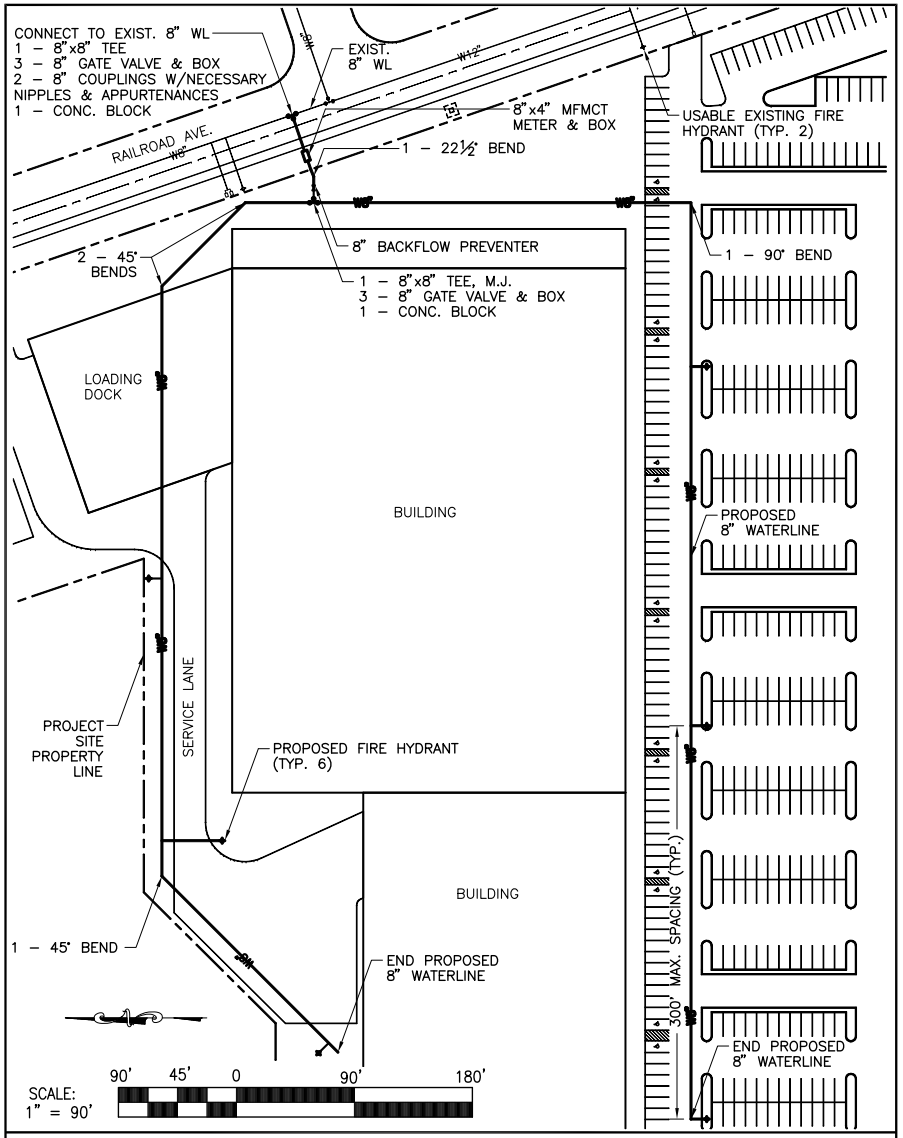
Department of Hawaiian Home Lands
East Maka'ala Mixed Use Development
Hilo, South Hilo, Hawaii Island
TMK: (3) 2-2-047: 059, Lot 5-A-1

Project Assessment Report
Figure 8.3:
Existing Drainage Structures & Utilities
Sheet 1/1, 10/15/08



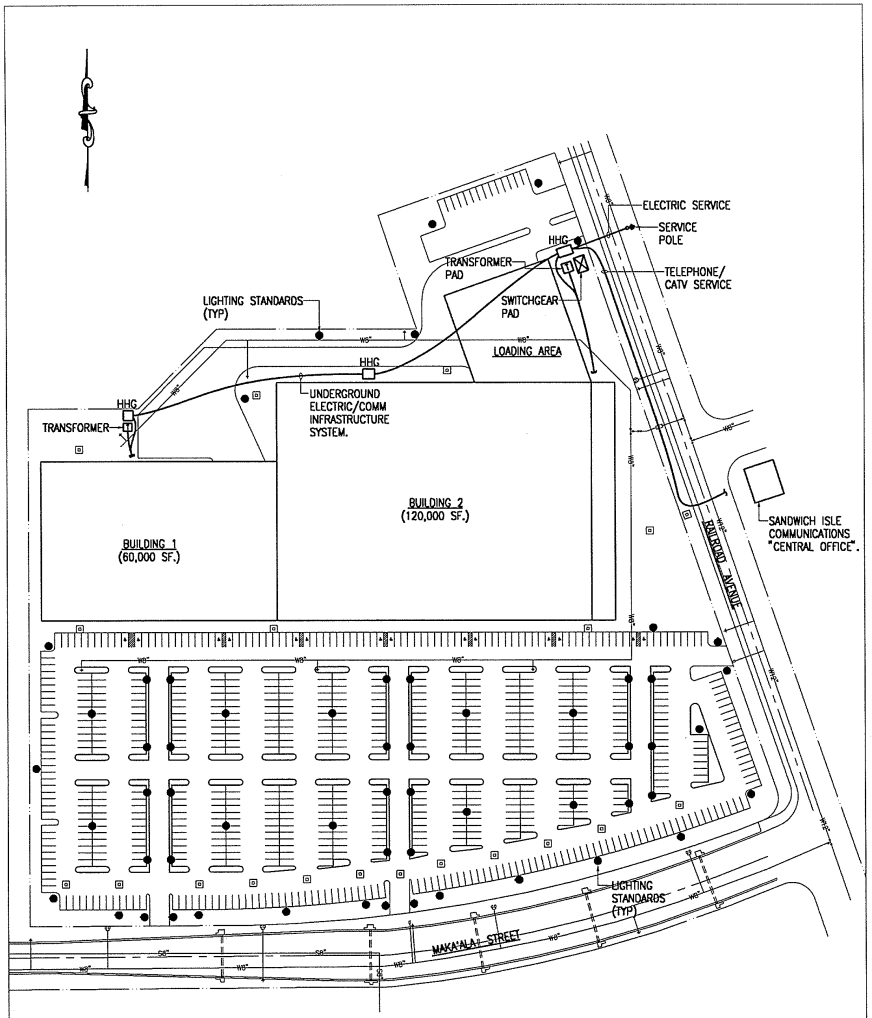
Department of Hawaiian Home Lands
East Maka'ala Mixed Use Development
Hilo, South Hilo, Hawaii Island
TMK: (3) 2-2-047: 059, Lot 5-A-1

Project Assessment Report
Figure 8.4:
Drainage Alternative 1 - Drywells
Sheet 1/1, 10/15/08



Department of Hawaiian Home Lands
East Maka'ala Mixed Use Development
Hilo, South Hilo, Hawaii Island
TMK: (3) 2-2-047: 059, Lot 5-A-1

Project Assessment Report
Figure 8.5:
Proposed Waterline Layout
Sheet 1/1, 10/15/08



DEPARTMENT OF HAWAIIAN HOME LANDS
EAST MAKA'ALA MIXEDUSE DEVELOPMENT
HILO, SOUTH HILO, HAWAII ISLAND
TMK: (3) 2-2-047: 059, LOT 5-A-1

PROJECT ASSESSMENT REPORT
FIGURE 8.6
ELECTRICAL WORK

SECTION 9:
APPENDIX

9.1 ON-SITE PRE-CONSTRUCTION DRAINAGE CALCULATIONS

- Using County of Hawaii Storm Drainage Standards dated Oct 1970
- Using relevant USGS map for existing ground topography

Coefficient C: *(using Table 1):*

Infiltration	0.07
Relief	0
Vegetal Cover	0
Development Type	0.15
C =	**0.22**

Time of Conc T_c: *(using Plate 3):*

Length (ft) =	900
Ground =	poor grass surface
% Slope =	1.5
T_c (min) =	25

Intensity I: *(using T_m=10 yr, Plate 1):*

Intensity of 1-hr rainfall (in.) = 5

(using Plate 4):

1-hr rainfall=5 in, T_c=25 min -->

I (inches/hr)= 7.70

Drainage Area A: **A (acres)= 15**

Flow Rate Q: **Q_{pre} = CIA = 25.41 cfs**

9.2 ON-SITE POST-CONSTRUCTION DRAINAGE & DRYWELL CALCULATIONS

- Using County of Hawaii Storm Drainage Standards dated Oct 1970
- Assume finished grade slopes similar to existing grades
- Assume 20 foot drywell can handle 6 cfs

MAIN PARKING LOT

Coefficient C: **$C_{impervious}$ = 0.9**

Time of Conc T_c: *(using Plate 3):*

Length (ft) =	350
Ground =	paved
% Slope =	1.5
T_c (min) =	6.5

Intensity I: *(using T_m =10 yr, Plate 1):*
Intensity of 1-hr rainfall (in.) = 5

(using Plate 4):
1-hr rainfall=5 in, T_c=6.5 min -->
I (inches/hr)= 12.00

Drainage Area A: **A (acres)= 6.45**

Flow Rate Q: **Q = CIA = 69.66 cfs**

No. of Drywells Needed: **Q / (6 cfs) = 12 drywells**
Approx. area handled per drywell = 0.54 acres

BUILDING

Coefficient C: **C_{roof} = 0.95**

Time of Conc T_c: *(using Plate 3):*

Length (ft) =	760
Ground =	paved
% Slope =	0.5
T_c (min) =	11.5

Intensity I: *(using T_m =10 yr, Plate 1):*
Intensity of 1-hr rainfall (in.) = 5

(using Plate 4):
1-hr rainfall=5 in, T_c=11.5 min -->
I (inches/hr)= 9.96

Drainage Area A: **A (acres)= 4.13**

Flow Rate Q: **Q = CIA = 39.08 cfs**

No. of Drywells Needed: **Q / (6 cfs) = 7 drywells**
Approx. area handled per drywell = 0.59 acres

REMAINING SITE

** Weight Factor for C value is percentage of "remaining site" area that is grassed or impervious*

Coefficient C: *(using Table 1):*

Infiltration	0.07		
Relief	0		
Vegetal Cover	0		
Development Type	0.15		
$C_{grassed}$ =	0.22	$C_{impervious}$ =	0.9
Weight Factor*:	0.62		0.38

$C_{weighted}$ = 0.48

Time of Conc T_c: *(using Plate 3):*

Length (ft) =	1000
Ground =	poor grass surface
% Slope =	1.5
T_c (min) =	26

Intensity I: *(using T_m =10 yr, Plate 1):*
Intensity of 1-hr rainfall (in.) = 5

(using Plate 4):
1-hr rainfall=5 in, T_c=26 min -->
I (inches/hr)= 7.58

Drainage Area A: **A (acres)= 4.34**

Flow Rate Q: **Q = CIA = 15.79 cfs ≤ (pre-construction flow=25.41 cfs)**
No drywells necessary

TOTAL POST-CONSTRUCTION FLOW: Q_{post} = 69.66+39.08+15.79 = 124.53 cfs

RUNOFF DIFFERENCE = (POST-CON FLOW) - (PRE-CON FLOW) = 124.53 cfs - 25.41 cfs = 99.12 cfs
TOTAL NUMBER OF DRYWELLS = 12+7 = 19 (19 * 6 cfs = 114 cfs --> difference taken care of) √

9.3 Generic Parking Lot Swale Worksheet for Triangular Channel

Project Description	
Worksheet	Parking Lot Swales
Flow Element	Triangular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coefficient	0.015	
Slope	0.015000	ft/ft
Left Side Slope	0.02	V : H
Right Side Slope	0.02	V : H
Discharge	5.95	cfs

Results		
Depth	0.2100	ft
Flow Area	2.2	ft²
Wetted Perimeter	21.00	ft
Top Width	21.00	ft
Critical Depth	0.24	ft
Critical Slope	0.006605	ft/ft
Velocity	2.70	ft/s
Velocity Head	0.11	ft
Specific Energy	0.3232	ft
Froude Number	1.47	
Flow Type	Supercritical	

o:\opro\2008\208-0~$\20802~b%.fm2 Okahara & Associates Inc Project Engineer: Hilo Office
10/13/08 03:48:15 PM © Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666 FlowMaster v6.0 [614b] Page 1 of 1

9.4 EXAMPLE OF PERVIOUS PAVEMENT TYPICAL SECTIONS

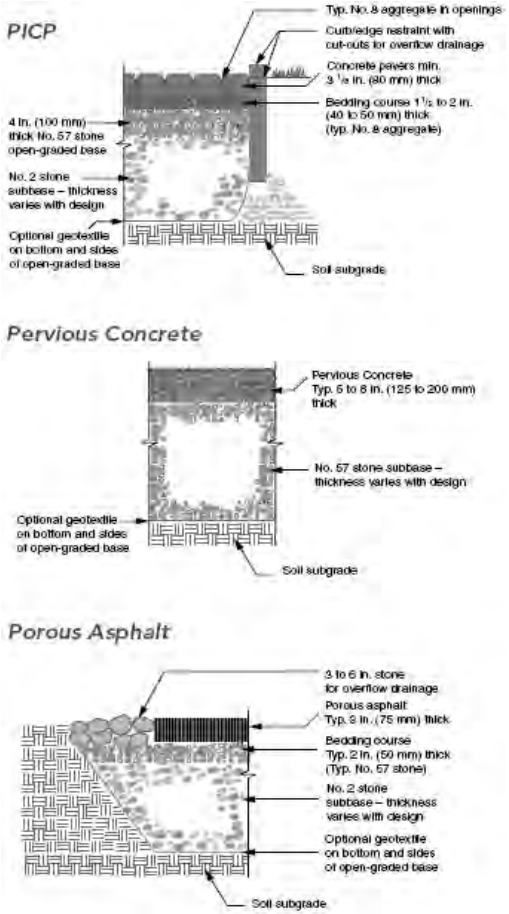


Figure 2. Typical PICP, pervious concrete and porous asphalt pavement sections. Surface and base thicknesses vary with traffic. Slower draining soils generally require thicker bases to store and infiltrate water. All can accommodate perforated drain pipes in the base for low infiltration soils.

9.4 EXAMPLE OF PERVIOUS PAVEMENT OVERFLOW CONTROL STRUCTURE

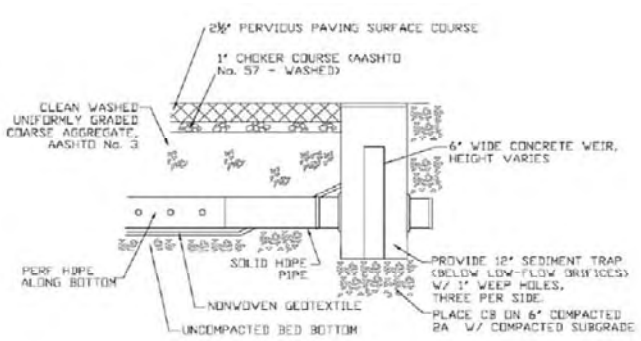


Figure 6.1-23 Detail showing typical outlet control structure

Typical Section Reference:
"Permeable Interlocking Concrete Pavement - A Comparison Guide to Porous Asphalt and Pervious Concrete", Interlocking Concrete Pavement Institute, Feb. 2008, http://www.icpi.org/myproject/PICP%20Comparison%20Brochure.pdf

Overflow Control Structure Reference:
"Pennsylvania Stormwater BMP Manual, Draft – January 2005", http://www.dep.state.pa.us/dep/subject/advcoun/stormwater/Manual_DraftJan05/Section 06-StructuralBMPs-part1.pdf

Water Usage History

Bar Graph
Pie Chart
Excel

Action | Update | Find | Browse | Nxt | Prv | Tab | Options | Quit
Additional options

WATER USAGE HISTORY

Account #: 87260150 10 Name: COSTCO WHSL #46798-00
Service : 73-5600 MAIAU ST A 7-3-051-001

Read Date	Days	BillType	Usage	Avg/Day	Amount Billed
08-11-2008	62	Regular	1067.00	17.21	3552.45
06-10-2008	63	Regular	988.00	15.68	3234.20
04-08-2008	57	Regular	1301.00	22.82	4220.15
02-11-2008	61	Regular	923.00	15.13	3029.45
12-12-2007	63	Regular	1048.00	16.63	3423.20
10-10-2007	65	Estimate	1129.00	17.37	3678.35
08-06-2007	60	Regular	995.00	16.58	3216.45
06-07-2007	57	Estimate	1165.00	20.44	3675.25
04-11-2007	57	Regular	1228.00	21.54	3867.40
02-13-2007	62	Regular	1292.00	20.84	4062.60
12-13-2006	65	Regular	976.00	15.02	3098.80
10-09-2006	63	Regular	1064.00	16.89	3367.20
08-07-2006	61	Regular	1219.00	19.98	3674.03

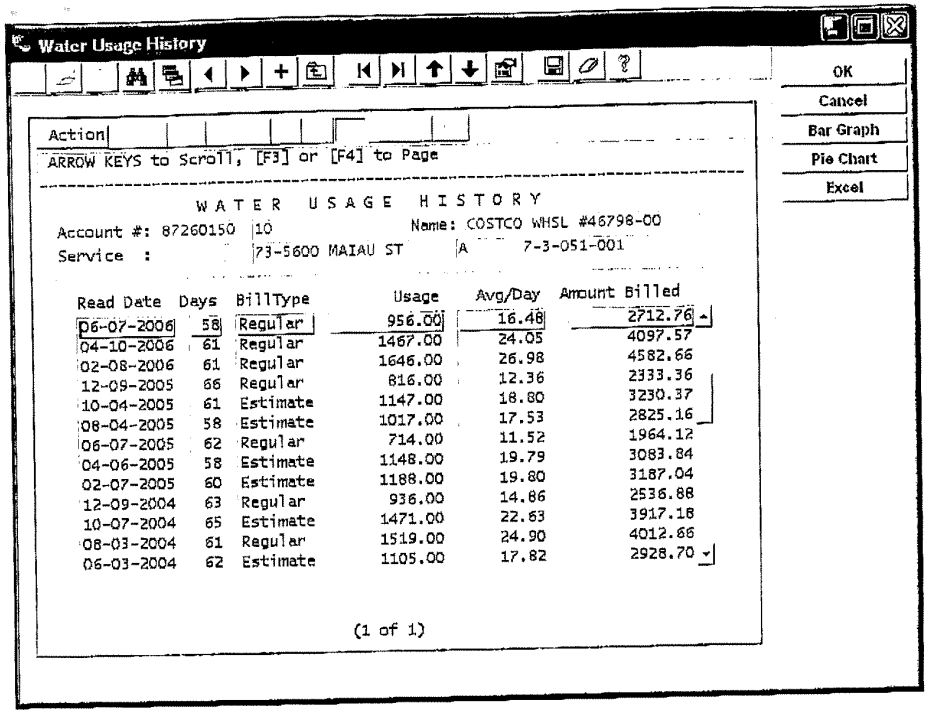
(1 of 1)

RECEIVED
SEP 25 2008
OKAHARA & ASSOCIATES, INC
HILO OFFICE

SEP 25 2008

Attn: Masahiro @ Okahara & Assoc
961-5529

FR: DWS/Cust Svc – Lani 961-8060



Note: Daily averages are in units of 1000 gallons

Average Daily Demand for 2005-2006 =
(15.02+16.89+19.98+16.48+24.05+26.98+12.36
+18.80+17.53+11.52+19.79+19.80)/12 =
18.267 x 1000 = 18,267 gallons/day

Hilo Admin

From: Pacleb, Jack [jpacleb@co.hawaii.hi.us]
Sent: Thursday, October 09, 2008 8:06 AM
To: 'hilo@okahara.com'
Subject: Proposed Costco building near Home Depot

As per our previous conversation, our office will approve a 1,500 gpm fire flow for this specific project if the entire building is sprinklered per NFPA 13 standards. If you have any questions, please do not hesitate to contact me.

Sincerely,

Jack Pacleb
Battalion Chief
Fire Prevention Bureau
Hawaii Fire Department
jpacleb@co.hawaii.hi.us
808.981.8370 (work)
808.981.2038 (fax)

9.7 ELECTRICAL PAY ITEMS

COST ESTIMATE SHEET

PROJECT: DHHL PROJECT ASSESSMENT										**Job No. 102008192**	
DHHL EAST MAKA'ALA MIXED USE DEVELOPMENT										**SHEET 1 OF 1**	
TMK: 2-2-047: 059, LOT 5-A-1										**10/16/08**	
ELECTRICAL										**BUDGET**	
ITEM (OR FEATURE)DESCRIPTION	**QUANTITIES**		**MATERIAL COSTS**		**LABOR COST**				**UNIT COST**	**TOTAL**
	NO. OF UNITS	**UNIT**	**UNIT COST**	**COST**	**UNIT M.H.**	**RATE**	**UNIT COST**	**COST**		
ELECTRICAL WORK										
1. MOBILIZATION/DEMOBILIZATION	1	LS		20,000	64	98		6,272		$26,272
2. TR/EXC/BF	1370	LF							70	95,900
3. R/W WORK	1								20,000	20,000
4. HHG	3	EA							18,000	54,000
5. SWITCHGEAR PAD	1	EA							3,000	3,000
6. TRANSFORMER PAD	2	EA							2,400	4,800
7. PRIMARY DUCTS (2-4" EP, 1-4"COMM)	1,200	LF							24	28,800
8. SECONDARY DUCTS (6-4" ES, 1-4" COMM)	240	LF							56	13,440
9. CONCRETE	180	CY							300	54,000
10. 16 FT LS/1 HD	28	EA							12,000	336,000
11. 20 FT LS/1 HD	18	EA							16,000	288,000
12. 20 FT LS/2 HD	5	EA							16,000	80,000
13. 30 FT LS/4 HD	11	EA							22,000	242,000
14. MISC WORK	1	LS							50,000	50,000
15. BUILDING 1	60,000	SF							20	1,200,000
16. BUILDING 2	120,000	SF							16	1,920,000
17. HELCO FEED OFF-SITE SUBSTATION	1	LS								1,800,000
18. HELCO FEED ON-SITE	1	LS								150,000
19. SIC FEE	1	LS								50,000
TOTAL										$6,416,212

OKAHARA & ASSOCIATES, INC.
Job No. **208-029** Date **10/15/2008**
Project **DHHL East Maka'ala Mixed Use Development**

9.8 PRELIMINARY COST ESTIMATE

		PAY ITEMS (DETAILED BREAKDOWN)	UNIT	QTY	UNIT PRICE	AMOUNT
1		Clearing and Grubbing	ACRE	15	$1,000.00	$15,000
2		Demolition of Existing Structures *	LS	1	$100,000.00	$100,000
3		Erosion Control	LS	1	$10,000.00	$10,000
4		Excavation	CY	40,000	$15.00	$600,000
5		2" Thick A.C. Pavement on 6" Thick Base Course **	SY	36,060	$40.00	$1,442,400
6		6" Thick Concrete for Loading Dock & Stock Area	CY	531	$150.00	$79,650
7		Concrete Curb	LF	6,486	$30.00	$194,580
8		Parking Space Striping	LF	7,317	$2.00	$14,634
9		Pavement Markings (Handicap Parking)	EA	14	$400.00	$5,600
10		Traffic Signs (Handicap Parking)	EA	21	$600.00	$12,600
11		20-Foot Deep Drywell **	EA	19	$18,000.00	$342,000
12		8" Waterline (includes trench excavation)	LF	1,824	$130.00	$237,120
13		8"x8" Tee, M.J.	EA	2	$800.00	$1,600
14		8" Gate Valve & Box	EA	6	$2,000.00	$12,000
15		8" Couplings w/Necessary Nipples & Appurtenances	EA	2	$1,500.00	$3,000
16		Horizontal Concrete Block	EA	7	$250.00	$1,750
17		8"x4" MFMCT Meter & Box	EA	1	$20,000.00	$20,000
18		8" Backflow Preventer	EA	1	$10,000.00	$10,000
19		Fire Hydrant Assembly (includes concrete pad)	EA	6	$5,000.00	$30,000
20		Cut & Plug Existing Service Laterals at Main (includes trench excavation, pavement patching and filling meter boxes)	EA	7	$5,000.00	$35,000
21		Connections to Existing Utility Lines	EA	1	$3,000.00	$3,000
22		Water Facilities Charge	LS	1	$177,930.00	$177,930
23		Landscaping (includes topsoil & grassing)	LS	1	$250,000.00	$250,000
24		Electrical Work	LS	1	$6,416,212.00	$6,416,212
					SUB TOTAL	$10,014,076
					MOBILIZATION (5%)	$500,704
					CONTINGENCIES (15%)	$1,502,111
					BASIC BID GRAND TOTAL	**$12,016,891**

** Environmental consultant may be needed to check if existing structures contain hazardous materials. Presence of hazardous materials may increase price for demolition.*
*** Specific to Drainage Alternative 1. Drainage Alternative 2 not included in this cost estimate*

Hawaii Electric Light Company, Inc. • PO Box 1027 • Hilo, HI 96721-1027

November 14, 2008

Wallace T. Oki, P.E., Inc.
Electrical Engineering
688 Kinoole Street, Suite 115B
Hilo, Hawaii 96720
Phone: 808-961-9666
Fax: 808-935-2549

Gentlemen:

Subject: Proposed DHHL East Maka'ala Mixed Use
TMK: (3) 2-2-47:72
Pana'ewa, District of South Hilo, Hawaii

Thank you for the opportunity to review the Subject Project located in South Hilo. HELCO will be able to provide electrical service to the proposed development as described subject to detailed analysis to be performed after receipt of your consultant's detailed design drawings and estimated demand.

1. Generation Capacity - HELCO's current system peak load is 203,300 kW and our total generation system capability is 269,850 kW. Our reserve margin is 33 percent and has adequate generation to serve the above.

2. Electrical Substation – The area is currently served by our existing 10.0MVA Kanoelehua electrical switching station and a 12,470 volt distribution overhead system along Railroad Avenue. Based on an assumption of 12.0W/sq-ft, the capacity of our existing switching station is not adequate to serve the estimated load of 2,160kW. One lot with a minimum size of 150' by 150' must be deeded to HELCO for the construction of a new substation.

3. Off-Site Electrical Distribution System – The existing off-site 12,470 volt distribution system along Railroad Avenue is not adequate to serve the proposed development.

4. On-Site Electrical System – On-site distribution line extensions and easements are required on the developer's property to serve the anticipated load. An environmental site assessment may be required to serve this development from our distribution system in the State right-of-way.

After the development's detailed electrical load calculations and civil plans are submitted, HELCO will design the electrical system and prepare a firm cost to provide electrical power to the development.

HELCO recommends energy efficient and conservation measures to reduce the maximum electrical demand and energy consumption. The developer may call HELCO's Energy Services Manager, Curtis Beck, at (808) 969-0134 for questions or details on available programs.

It is encouraged that the developer's electrical consultants open a service request with HELCO's Engineering Department as soon as practicable to ensure timely electrical facility installation.

Should you have any questions, please contact Hal Kamigaki at (808) 969-0322.

Sincerely,

Hal K. Kamigaki
Engineering Department

JSD:HKK:gk

cc: S. Oshiro
A. Imoto

APPENDIX B. ARCHEOLOGICAL AND CULTURAL ASSESSMENT REPORT

RECHTMAN CONSULTING, LLC
HC 1 Box 4149 Kea'au, Hawai'i 96749-9710
phone: (808) 966-7636 fax: (808) 443-0065
e-mail: bob@rechtmanconsulting.com
ARCHAEOLOGICAL, CULTURAL, AND HISTORICAL STUDIES

October 19, 2008 RC-0559

Morgan Davis
Assistant Hawai‘i Island Archaeologist
DLNR-SHPD
2100 Kanoelehua Avenue, Unit C-5
Hilo, HI 96720

Dear Morgan:

At the request of Terry Ogawa of Group 70 International, Inc., on behalf of their client the Department of Hawaiian Home Lands (DHHL), Rechtman Consulting, LLC has prepared this request for determination of “no historic properties affected” associated with the proposed commercial development of a roughly 15 acre project area within Tax Map Key: 3-2-2-47:072 in Wai kea Ahupua‘a, South Hilo, Island of Hawai‘i. The current study parcel is bordered by Railroad Avenue to the east, East Maka‘ala Street to the south, and commercial development bounds the property to the west and north (Figures 1 and 2).

The soil in the study area is classified as Papai extremely stony muck (rPAE), a very dark brown and slightly acid soil that is approximately 8 inches thick, and is underlain by fragmental *‘a‘ā* lava. These soils have formed over Mauna Loa lava flows that are approximately 750-1,500 years old (Wolfe and Morris 1996). If still present, the natural vegetation within the study area would consists of *‘ōhi‘a*, tree fern, *uluhe* fern, and guava. Currently, the study area exhibits a limited vegetation cover of exotic weeds and grasses (Figure 3). The entire project area appears to have been substantially graded in the past. There have been several metal and wooden industrial structures built on the property (Figures 4 and 5); however, none of these was built before 1966.

Early archaeological study of East Hawai‘i was conducted by Hudson (1932) for the B. P. Bishop Museum. He noted that, “there was an important village and trading center around Hilo Bay” (1932:20), but related that, “no archaeological remains are to be found within the town of Hilo itself except a few stones which are said to have been taken from heiaus…” (1932:226). Hudson relates that one *heiau* was formerly present in Wai kea Ahupua‘a near the route of the present Kilauea Avenue, he writes:

> There was a heiau named Kapaieie near Honokawailani in Waiakea. Bloxam who passed the site on his way from Hilo to the volcano say that its center was marked by a single coconut tree. At the time of his visit nothing remained but ruined walls choked with weeds. He was told that the priests would lie in wait for passersby and dispatch them with clubs. Thrum [1907:40] states that the site was famed in the Hilo-Puna wars buts its size and class are unknown. No remains of any kind could be found and no Hawaiians with whom I talked had ever heard of it. (Hudson 1932:240)

More recent archaeological studies in Wai kea Ahupua‘a (Borthwick et al. 1993; Carson 1999, Devereux et al. 1997; Escott 2004; Hunt and McDermott 1993; Maly et al.1994; Rechtman and Henry 1998; M. Rosendahl 1988a; M. Rosendahl 1988b; M. Rosendahl and Talea 1988; and Spear 1995) have produced negative results or have identified, almost exclusively, historic archaeological remains associated with either U.S. Military activity or the Wai kea Sugar Plantation, which operated in Wai kea Ahupua‘a between 1879 and 1947 (Rechtman and Henry 1998). One additional study (Wolforth 2004) addressed possible ancient fishpond sites along the Wai kea shoreline. Each of the aforementioned studies is discussed in detail below.

Hunt and McDermott (1993) conducted an archaeological inventory survey of the then proposed P ‘ inak Street extension within Wai kea Ahupua‘a to the southwest of the current project area. As a result of that survey 11 sites containing 97 features were recorded within the proposed road alignment. All of the recorded sites and features were determined to be historic in origin and associated with the Wai kea Sugar Plantation. Three volcanic glass flakes recovered from an excavation beneath one of the features suggesting Precontact use of the project area, but no surface Precontact remains were present.

Borthwick et al. (1993) conducted an archaeological inventory survey of two small parcels (TMKs:3-2-4-01:040 and 157) located to the northwest of the current project area within Wai kea Ahupua‘a. As a result of that survey four sites were recorded that were all of historic origins and related to the use of the area by the Wai kea Sugar Plantation.

Maly et al. (1994) conducted an Archaeological Inventory Survey of a 4.5-acre parcel located to the west of the current project area (TMK:3-2-4-57:001). Four sites containing a total of 51 features were recorded as a result of that study. The identified features included rock mounds, walls, and an enclosure. It was determined that all of the features were associated historic use of the area for sugarcane cultivation. Nevertheless, further investigation was recommended at the sites to test for the possibility of subsurface Precontact cultural deposits. Subsequent data recovery work was carried out by Spear (1995). No Precontact cultural deposits were located during the data recovery excavations and it was concluded that all of the sites were constructed during Historic times for sugarcane cultivation.

Rechtman and Henry (1998) conducted an archaeological Inventory Survey of roughly 40 acres located within Wai kea Ahupua‘a between K wili Street and P ‘ inak Street to the west of the current project area (TMK:3-2-4-01:005). As a result of that survey a single site (SIHP Site 21461) consisting of 117 features was recorded on the subject parcel. The recorded features included seven walls, five sets of parallel walls, three enclosures, and 102 mounds. These features were all related to the historic use of the parcel for sugarcane cultivation. The mounds were all situated on bedrock at the top or bottom edges of slopes and were determined to be clearing piles. The parallel walls represented either irrigation ditches or right-of-ways associated small gauge railroad lines. While the remaining core-filled walls and the enclosures were used for an undetermined historic function likely related to sugarcane cultivation.

Escott (2004) conducted an Archaeological Inventory Survey of a 258-acre parcel located to the west of the current project area within Wai kea Ahupua‘a (TMK:3-2-4-01:122). As a result of the survey, Escott (2004) recorded nineteen archaeological sites, all of which were interpreted as being historic in age and related either to sugarcane cultivation, ranching, or military activities. The recorded sites included two rock alignments, a rock concentration, a rock mound, six sugarcane fields, an enclosed lava blister, a water catchment, three dirt roads, two World War II era U.S. military fighting positions, the old location of the Fair View Dairy where later military activities took place during World War II, and a old fence line marked by three iron fence posts. The six sugarcane field sites all contained multiple features, nearly all of which were recorded as various shaped clearing mounds.

PHRI conducted three small studies (M. Rosendahl 1988a; 1988b; M. Rosendahl and Talea 1988) in elevationally lower portions of Wai kea and found no archaeological resources. Likewise, a study of 176 acres conducted in the Pana‘ewa section of Wai kea (Carson 1999), to the east of the current study area resulting is no archaeological sites identified.

Devereux et al. (1997) preformed a reconnaissance survey for the Keaukaha Military Reservation, a 503.6 acre parcel located to the northeast of the current study area south of the Hilo International Airport. In addition to Historic-era military structures, they identified the location of a traditional trail and two associated shelter/habitation areas. It was concluded that these latter sites could be of Precontact origin.

For an in-depth culture-historical background and specific history of Wai kea the reader is referred to Kelly et al. (1981), Maly (1996a), Maly (1996b), Moniz (n.d.), and McEldowney (1979). Information from these sources is summarized below.

The earliest historical knowledge of Hilo comes from legends written by Kamakau (1961) of a 16th century chief ʻUmi-a-Liloa (son of Liloa) who at that time ruled the entire island of Hawaiʻi. Descendants of Umi and his sister-wife were referred to as "Kona" chiefs, controlling Kaʻ , Kona, and Kohala, while descendants of Umi and his Maui wife were "Hilo" chiefs, controlling H m kua, Hilo, and Puna (Kelly et al. 1981). According to Kamakau (1961) both sides fought over control of the island, desiring access to resources such as feathers, *māmaki* tapa, and canoes on the Hilo side; and *wauke* tapa, and warm lands and waters on the Kona side (c.f. Kelly et al. 1981).

Sometime near the end of the 16th century or early in the 17th century, the lands of Hilo were divided into *ahupuaʻa* that today retain their original names (Kelly et al. 1981). These include the *ahupuaʻa* of Puʻuʻeo, Piʻihonua, Punahoa, P nohawai, K k au and Wai kea (Figure 6). The design of these land divisions was that residents could have access to all that they needed to live, with ocean resources at the coast, and agricultural and forest resources in the interior. However, only Piʻihonua and Wai kea provided access to the full range of resources stretching from the sea up to 6,000 feet along the slopes of Mauna Kea (Kelly et al. 1981).

Historical accounts (McEldowney 1979) indicate that much of Wai kea was in a zone of agricultural productivity. As Isabella Bird recorded upon arriving in Hilo in 1873:

> Above Hilo, broad lands sweeping up cloudwards, with their sugar cane, *kalo*, melons, pine-apples, and banana groves suggest the boundless liberality of Nature. (Bird 1964:38)

Handy and Handy (1972) also describe the general region as an agricultural area:

> On the lava strewn plain of Waiakea and on the slopes between Waiakea and Wailuku River, dry taro was formerly planted wherever there was enough soil. There were forest plantations in Panaewa and in all the lower fern-forest zone above Hilo town along the course of the Wailuku River. (Handy and Handy 1972:539)

Maly (1996a) refers to a 1922 article from the Hawaiian Language newspaper, *Ka Nupepa Kūʻokuʻa*, where planting on *pāhoehoe* lava flats is described:

> There are *pahoehoe* lava beds walled in by the ancestors in which sweet potatoes and sugar cane were planted and they are still growing today. Not only one or two but several times forty (*mau kaʻau*) of them. The house sites are still there, not one or two but several times four hundred in the woods of the Panaewa. Our indigenous bananas are growing wild, these were planted by the hands of our ancestors. (Maly 1996a:A-2)

Hilo was one of the larger population centers on the Island of Hawaiʻi, and also an area frequented by the *aliʻi* (Moniz n.d.). Captain George Vancouver, an early European explorer who met with Kamehameha I at Wai kea in 1794, recorded that Kamehameha was there preparing for his invasion of the neighbor islands, and that Hilo was an important center because his canoes were being built there (Moniz n.d.:7). The people of Hilo had long prepared for Kamehameha's arrival and collected a large number of hogs and a variety of plant foods, to feed the ruler and his retinue. Kelly et al. (1981) surmises that the people of Hilo had actually prepared for a year prior to Kamehameha's visit and expanded their fields into the open lands behind Hilo to accommodate the increased number of people that would be present. Kelly et al. (1981) also speculates that many of the fish ponds in Wai kea were created to feed Kamehameha, his chiefs, and craftsmen. It was during this early Historic Period that Wai kea Ahupuaʻa became part of Kamehameha I's personal land holdings (Moniz n.d.:11).

William Ellis, one of the first missionaries to arrive in Hawaiʻi, spent five days in Wai kea in 1823 (Ellis 1963). He described it as a well-watered place, with some of the heaviest rains and densest fog he had encountered on the island. He considered the inhabitants lucky because of the well-stocked fishponds, fertile soil, and nearby woods as a source of lumber. Ellis (1963) estimated that nearly 400 houses were present near the bay, with a population of not less than 2,000 inhabitants. Ellis eventually set up a mission station in Wai kea that lasted until 1825 before moving to Punahoa 2nd Ahupuaʻa (Moniz n.d.).

As a result of the *Māhele* in 1848, nearly all of the *ahupuaʻa* of Wai kea became Crown Lands (for the occupant of the throne). According to Moniz (n.d.:12) twenty-six *kuleana* claims (LCAw.) were registered for lands in Wai kea; most of these lands were centered along fishponds or major inland roads, and none were in the immediate vicinity of the current study area. Most of the awards were for houselots and cultivated sections. One of the Land Commission Awards (LCAw. 7713) was for the *ʻili* of Piʻopiʻo, which was traditionally the residence of chiefs, and which later served as the location of the original mission station in Wai kea (Moniz n.d.:9). This land was given by Kamehameha I to his wife Kaʻahumanu, and then awarded to Victoria Kamamalu during the *Māhele*. Kamehameha IV, Alexander Liholiho, as the occupant of the throne during the *Māhele*, received the rest of the Ahupuaʻa.

Following the *Māhele*, Kamehameha IV leased large portions of Wai kea to outside interests for pasture and sugarcane cultivation (Moniz n.d.). In 1861 S. Kipi leased the Crown Lands of Wai kea for the rate of $600 dollars a year to be used as pasture land for five years (Kelly et al. 1981; Maly 1996a). In 1874 the first lease for sugarcane cultivation in Wai kea was granted to Rufus A. Lyman for a term of 25 years. The lease granted him all the privileges of the land including the use of the fishponds and the cutting of firewood (Maly 1996a). This lease was eventually transferred to the Wai kea Mill Company, founded by Alexander Young and Theo H. Davis, and the Wai kea sugar plantation was established.

Established in 1879, the Wai kea Mill Company started with about 350 acres of cultivated lands they had acquired from Lyman. In 1888 the company acquired a 30-year lease that increased their land holdings in Wai kea Ahupuaʻa. When the lease ran out in 1918 the acreage under cultivation had increased to nearly 7,000; but without a lease the *ahupuaʻa* fell under the homesteading laws, which required the government to lease the land to individual growers. Wai kea Mill Company was expected to grind the crop for the independent growers under a contract that gave the company 40% of the proceeds from the sale of the refined sugar. Contractual and legal problems combined with a declining sugar market and the devastating tsunami of 1946 led the Wai kea Mill Company to cease operation in 1947. During the 68 years of its operation, the Wai kea Mill Company was a major force in shaping the economic and social growth of Hilo, and certainly left its mark on both the cultural and physical landscapes of the area.

The current project area remained undeveloped until March 6, 1966 when Canadian Pacific Corporation, formerly Hawaiian Timber Company, obtained a 40-year lease from DHHL to operate a saw mill specializing in *koa*. Six structures were constructed in support of the saw mill. The three-section main structure consisted of a 1,152 square feet, dirt floor, open side canopy. There were also two 1,200-square feet, slanted roof, open side, dirt floor saw mill sheds. Two 3,977-square feet and one 12,000-square feet, open side warehouses comprised the final three structures. These are some of the structures that can be seen on the property today. The saw mill continued its operation until the early 1980s.

The lease between DHHL and Canadian Pacific Corporation was subsequently assigned to Akana Petroleum on July 31, 1985 and soon thereafter, Akana Petroleum commenced operations as a jobber of Chevron petroleum products, and continues to operate on the study property.

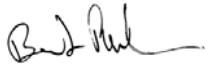
Given the culture-historical background, the results of previous archaeological studies in the vicinity of the project area, and the existing conditions of the property, the archaeological expectations for the current study parcel are extremely limited. It is likely that if any archaeological features were ever present they have been significantly disturbed if not completely destroyed by modern land use activities.

On September 15, 2008, Robert B. Rechtman, Ph.D. and Ashton K. Dircks, B.A. performed a field inspection of the project area, the limits of which were clearly identifiable in the field. The entire surface area of the property, which appears to have been 100% graded in the past, was visually inspected. No archaeological resources were observed within the project area and given the extensive ground disturbance and the nature of the substrate the likelihood of encountering subsurface resources is extremely remote. Based on these negative findings, on behalf of our client, we are requesting that DLNR-SHPD issue a written determination of "no historic properties affected" in accordance with HAR 13§13-284-5(b)1.

In the unlikely event that archaeological resources are encountered during future development activities within the current study area, work in the immediate area of the discovery will be halted and DLNR-SHPD contacted as outlined in Hawai‘i Administrative Rules 13§13-275-12.

Should you require further information, or wish to visit the parcel, please contact me directly.

Respectfully,



Bob Rechtman, Ph.D.
Principal Archaeologist

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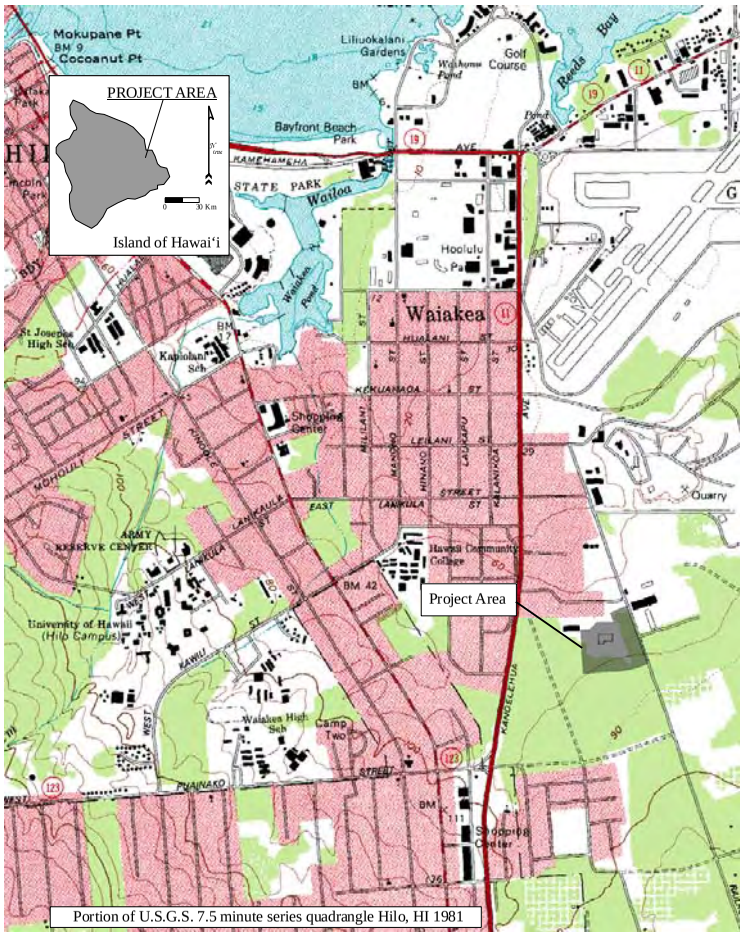

Figure 1. Project area location.

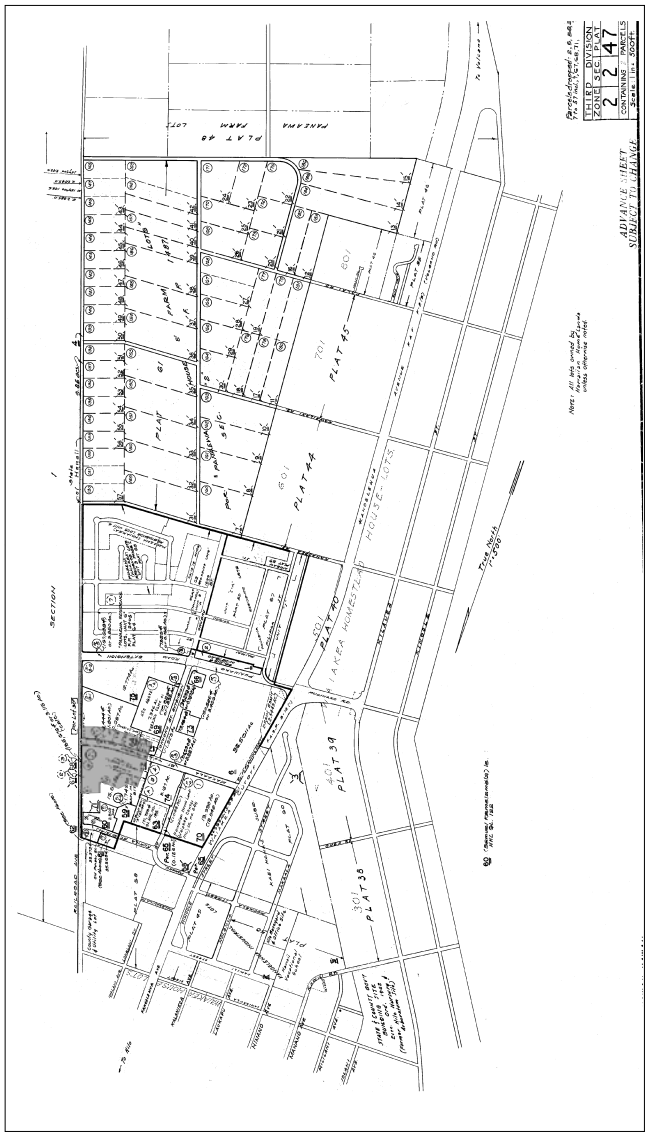

Figure 2. TMK 3-2-2-47 showing study parcel (Parcel 72, shaded).

Figure 3. View to the north of the undeveloped eastern portion of the study area.

Figure 4. Remnant building from the former saw mill.

Figure 5. Building from the saw mill that has been reused by Akana Petroleum.

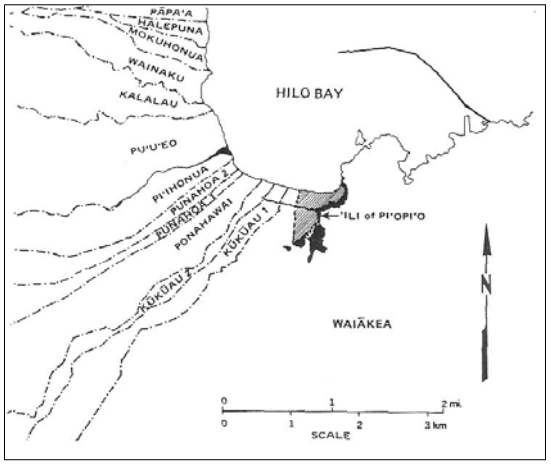

Figure 6. Hilo Bay showing *ahupua'a* (from Kelly et al. 1981).

APPENDIX C. TRAFFIC IMPACT ASSESSMENT REPORT

Traffic Impact Analysis Report
Revision 1

for

East Maka'ala Mixed Use Development
Hilo, Island of Hawai'i, Hawai'i

Tax Map Key Number *(3)2-2-047: 072*

MARCH 2009

Prepared for:

Group 70 International, Inc.
925 Bethal Street, 5th Floor
Honolulu, Hawaii 96813-4307

Prepared by:

M&E Pacific, Inc. | AECOM

Davies Pacific Center, 841 Bishop Street
Suite 1900, Honolulu, Hawai'i 96813

DEPARTMENT OF HAWAIIAN HOME LANDS
EAST MAKA'ALA MIXED USE DEVELOPMENT
Hilo, Island of Hawai'i, Hawai'i

Traffic Impact Analysis Report

Revision 1

TMK: (3)2-2-047: 072

March 2009

Expiration Date:
April 30, 2010

This work was prepared by me or under my direct supervision.

Signature
M&E Pacific, Inc. AECOM

27 MAR 2009
Date

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TRAFFIC IMPACT ANALYSIS REPORT

for the

DEPARTMENT OF HAWAIIAN HOME LANDS
EAST MAKA'ALA MIXED USE DEVELOPMENT

Revision 1

This report updates the original Traffic Impact Analysis Report prepared in November 2008 for an industrial/mixed-use development being proposed on Department of Hawaiian Home Lands (DHHL) land in Hilo, Hawai'i. This report analyzes the traffic impacts of a larger discount superstore and addresses the comments submitted by the State of Hawai'i Department of Transportation (DOT). This study includes a review of existing roadway and traffic conditions, forecast of future conditions, analysis of the forecast volumes, and recommends mitigating measures.

PROJECT DESCRIPTION

The DHHL proposes to develop an industrial/mixed-use development in Hilo, Hawai'i. The 15.574 acre project site is bordered by Railroad Avenue and East Maka'ala Street in the area east of the Walmart store. The project site is currently identified as Tax Map Key (3) 2-2-047: 072. The location of the project site in relationship to the local road system is shown on **Figure 1**.

The proposed project includes 220,000 square feet of mixed industrial and commercial use consisting of a 160,000 square foot stand-alone discount superstore (Target) and a 60,000 square foot supermarket (Safeway). There would be approximately 712 standard parking spaces, 14 accessible parking spaces, and curbed and uncurbed islands, depending on further site development analysis. Driveways are proposed on East Maka'ala Street and Railroad Avenue, with a service lane/driveway on Railroad Avenue. The two proposed driveways along East Maka'ala Street would be located directly across from the Home Depot store driveways. The proposed conceptual site plan is shown on **Figure 2.** Completion of the proposed project is scheduled for 2012. This study analyzed future traffic operations for the year 2013 to allow for full

development of the project. Development and phasing plans will not become available until the design phase; therefore, this study does not include analysis of the intermediate years to full development.

Based on the location of the proposed project in relation to the roadway system, this study analyzed the traffic impacts at the following intersections:

- Kanoelehua Avenue/East Puainako Street
- Kanoelehua Avenue/East Maka'ala Street
- Kanoelehua Avenue/Pohaku Street
- East Puainako Street/Railroad Avenue
- East Puainako Street/Ohuohu Street
- East Maka'ala Street/Railroad Avenue
- East Maka'ala Street/Home Depot *mauka* (west) driveway
- East Maka'ala Street/Ohuohu Street
- East Maka'ala Street/Waiakea Center/Prince Kuhio Plaza driveways

These study intersections are identified on **Figure 1**. Although the Home Depot store has several access driveways on East Maka'ala Street and Railroad Avenue, the "busiest" driveway was selected for analysis.

EXISTING CONDITIONS

A survey of existing roadway and traffic conditions was made between September and October 2008.

Existing Roadways

The proposed industrial/mixed-use development will be located in an area adjacent to other major retailers. Primary access to this retail area from other areas of Hilo and the rest of the island is provided by Kanoelehua Avenue and Puainako Street.

Kanoelehua Avenue is a major arterial that provides north-south access between Hilo and the Kea'au and Volcano districts. It is a five-lane divided arterial in the vicinity of

the project site with turning lanes and traffic signals at major cross streets, including the East Puainako Street and East Maka'ala Street intersections. The Pohaku Street intersection has separate turning lanes but is unsignalized. The highway is under the jurisdiction of the DOT and is designated as State Route 11.

Puainako Street is on an east-west alignment that begins at Railroad Avenue on the east and merges into Kaumana Drive on the west. The four-lane section between Kanoelehua Avenue and Railroad Avenue is named East Puainako Street and is under the jurisdiction of the County of Hawai'i. The remaining section west of Kanoelehua Avenue is named West Puainako Street and is under the jurisdiction of the DOT. The roadway section between Kanoelehua Avenue and Kilauea Avenue is a four-lane collector road with a combination of raised and painted medians restricting the locations where left turns can be made. The roadway section west of Kilauea Avenue to Komohana Street is a two-lane undivided collector road. A new *mauka* roadway between Komohana Street and Kaumana Drive was recently constructed.

The DOT currently classifies Puainako Street as a major collector roadway although the County of Hawai'i *General Plan* classifies Puainako Street as a primary arterial with a minimum right-of-way width of 120 feet. The DOT is currently undertaking the Puainako Street Widening Project from Komohana Street to Kilauea Avenue in phases. They are working from *mauka* to *makai* to complete the project. The DOT is currently designing a new roadway section between Komohana Street and Kawili Street west of the current alignment. The two-lane roadway section between Kawili Street and Kilauea Avenue would be widened to four lanes. The Statewide Transportation Improvement Program, FY 2008 through 2011, shows two separate right-of-way acquisitions from Komohana Street to Kawili Street and from Kanoelehua Avenue to Komohana Street programmed in FY 2013. The remainder of the project has not been programmed and DOT staff is not able to provide a completion date for the entire project.

Two major east-west roadways provide access to the retail areas between Kanoelehua Avenue and Railroad Avenue: East Puainako Street and East Maka'ala Street. East Puainako Street is a four-lane facility from Railroad Avenue to Kanoelehua Avenue.

The roadway section between Kanoelehua Avenue and Ohuohu Street is undivided with striped left turn lanes at access points to the retail centers. The remaining roadway section between Ohuohu Street and Railroad Avenue has a raised median. East Maka'ala Street is a four-lane undivided facility between Railroad Avenue and Kanoelehua Avenue with striped left turn lanes at access points to the Waiakea Center and Prince Kuhio Plaza west of Ohuohu Street.

The intersection of Kanoelehua Avenue and Puainako Street was improved as part of the Puainako Street improvement project. All four approaches have separate left turn and right turn lanes, with the northbound approach of Kanoelehua Avenue having two left turn lanes. The northbound Kanoelehua Avenue approach has two through lanes while the southbound approach has three. The eastbound approach of West Puainako Street approach has a single through lane while the westbound approach of East Puainako Street has two. The intersection is controlled by an eight-phase traffic signal with all left turn movements made on protected left turn phases.

The intersection of Kanoelehua Avenue and East Maka'ala Street was also improved to serve the retail centers. The northbound approach of Kanoelehua Avenue has two through lanes and separate left and right turn lanes, while the southbound approach has three through lanes and two left turn lanes. The median separating the southbound left turn lane from the northbound through lanes is substandard. The westbound approach of East Maka'ala Street has a left turn lane, a shared left/through lane, and a right turn lane. The eastbound approach has a shared left/through lane and a right turn lane. The intersection is controlled by a six-phase traffic signal. The left turn movements from Kanoelehua Avenue can only be made on a protected left turn phase, while each approach of East and West Maka'ala Streets moves on separate (split) phases.

The intersection of Kanoelehua Avenue and Pohaku Street is north of the previous intersection and is not signalized. The Pohaku Street westbound approach is striped for outbound left and right turn movements and is stop sign controlled. Movements into Pohaku Street can be made from separate left and right turn lanes on Kanoelehua Avenue. The median separating the southbound left turn lane from the northbound

through lanes is substandard. Pohaku Street provides access to an industrial area and serves as a "back" entrance into the Waiakea Center.

Railroad Avenue is a two-lane roadway running parallel to and east of Kanoelehua Avenue. It provides access from an industrial area in the north to an agricultural park in the south. Ohuohu Street is a two-lane local road that runs north to south behind the Prince Kuhio Plaza. It provides secondary access to the Prince Kuhio Plaza and a satellite parking lot, and connects East Maka'ala Street with East Puainako Street and the adjacent residential area to the south.

The four study intersections on Ohuohu Street and Railroad Avenue are stop sign controlled. Ohuohu Street has stop signs at its approaches to East Maka'ala Street and East Puainako Street. The East Maka'ala Street and East Puainako Street approaches to Railroad Avenue are stop sign controlled. The driveways of the Home Depot store, Waiakea Center, and Prince Kuhio Plaza are not signalized.

Traffic Volumes

Traffic turning movement counts were taken at the eight study intersections between September 23 and October 25, 2008. Traffic turning movement counts require traffic surveyors to station themselves by each study intersection and record each vehicle movement as through or turning movements by 15 minute intervals. On weekdays, traffic counts were taken during the morning (6:00 to 8:30 a.m.) and afternoon (2:00 to 5:30 p.m.) peak periods and on Saturdays between 9:00 a.m. and 1:00 p.m. The worksheets for the traffic counts are included in **Appendix A**. Due to the length of the Saturday count period, the traffic counters were given one 15 minute period break midway into the counting period. The traffic volumes for these break periods were averaged from the traffic volumes before and after the break periods and have been shaded to show their status as derived volumes.

The resultant peak hour movements are summarized on **Figure 3**. The morning peak hour generally began between 7:00 and 7:15 a.m., and the peak hour volumes are shown on **Figure 3A**. **Figure 3B** shows the afternoon peak volumes, which generally

began at 3:15 p.m. on Ohuohu Avenue and Railroad Avenue, and 3:30 and 4:30 p.m. on Kanoelehua Avenue. The highest Saturday volumes, shown on **Figure 3C,** were generally recorded between 12:00 noon and 1:00 p.m. Traffic volumes are rounded to the nearest five vehicles per hour (vph).

The dominant direction of travel on Kanoelehua Avenue is northbound during the morning peak and southbound during the afternoon peak. The traffic volumes on East Puainako Street and East Maka'ala Street are slightly higher on Saturdays than their corresponding weekday afternoon peak hour volumes. The current traffic operations at the study intersections are discussed in the **Level of Service Analysis** section of this report.

Traffic counts were taken at six of the study intersections in October 2003 for the "Traffic Impact Analysis Report Home Depot Hilo" (November 2003), prepared by M&E Pacific, Inc. The 2003 and 2008 approach traffic volumes are shown and compared on **Figure 4**, with the numerical and percentage changes in volumes noted.

There are a mixed range of changes; most of the approaches show an increase in traffic volume while a few approaches show a decrease in traffic volume. In general, the highest rates of increase occurred on Railroad Avenue, Ohuohu Avenue and the length of East Maka'ala Street between these two roadways, due to the lower base volumes in 2003. These increases could be attributed to the opening of the Home Depot store in the period between the counts. A comparison of the traffic forecasts for the Home Depot store with the current volumes would indicate that the traffic being generated by the Home Depot is lower than the forecasts from the 2003 study.

The Kanoelehua Avenue approaches show larger increases in traffic volumes but lower rates of increase than the former three roadways, due to the Kanoelehua Avenue approaches having had much higher base volumes in 2003. The rates of increase on the Kanoelehua Avenue ranged from 1% to 19%, with two approaches showing negative growth.

Traffic turning movement counts were taken along East Maka'ala Street in November 2008 during the weekday morning, mid-day and afternoon peak periods for another study. The traffic count volumes are similar to those shown in this report. The traffic counts at the Waiakea Center and Prince Kuhio Plaza driveways were utilized for further analysis.

The DOT has taken metered traffic counts at selected locations on the Island of Hawai'i roadways in even numbered years to 2004. One of the counts (Station 18-G) was taken at the study intersection of Kanoelehua Avenue and East Puainako Street. Subsequent to 2004, the DOT changed their traffic counting policy and switched their count locations from intersections to roadway approaches so that data was not counted for all legs of the study intersections. Counts taken on the north leg of Kanoelehua Avenue and on East Puainako Street in 2006 were used with the corresponding legs of the pre-2004 counts. The data from these counts provides the historic trend in daily traffic volumes on different legs of the intersections over the twelve year period ending in 2006.

The historical trend in two-way daily traffic volumes for the Kanoelehua Avenue and East Puainako Street intersection is shown in tabular and graph form on **Figure 5**. The graphs show mixed periods of increase and decrease, which would indicate a no or low level of growth. Traffic volumes on the north leg of Kanoelehua Avenue decreased from 1994 to 1998, increased to its highest volume in 2000, declined sharply in 2002, then increased slightly in 2004 and 2006. Traffic volumes increased at an annual rate of 0.57% within the 12 year period, and at an annual rate of 2.1% from 2002 to 2006. Daily two-way traffic volumes on the south leg of Kanoelehua Avenue was at its highest level in 1994, decreased in 1996, increased in 1998, decreased in 2000, and then increased in 2002 and leveled off in 2004 at volumes that are below the 1994 volumes.

Traffic volumes on the East Puainako Street leg increased from 1994 to 1996, decreased in 2002, and then increased at an annual rate of 5.2% to 2006, for an annual growth rate of 0.56% within the 12 year period. Daily traffic volumes on West Puainkao Street leg decreased 24% from 1994 to 2004.

The DOT data also provides information on the pattern of hourly traffic volumes. The hourly traffic volumes on Kanoelehua Avenue north of Puainako Street on October 17 - 18, 2006, are shown in tabular and graph form on **Figure 6**. The northbound traffic peaks in the morning between 7:00 and 8:00 a.m., while the opposing southbound traffic peaks in the afternoon starting at 4:00 p.m.

PROPOSED ROADWAY IMPROVEMENTS

Currently, there are no roadway improvements listed in the FY 2008-2011 Statewide Transportation Improvement Program, (revised April 14, 2008) within the study area.

TRAFFIC FORECASTS

The proposed project is expected to be occupied in about four to five years. During this period, ambient traffic on the project area roadways can be expected to increase due to regional growth and new projects in the area. The traffic that would be generated from the proposed project was added to the ambient traffic forecast to obtain the total with project traffic forecast.

Ambient Traffic Forecast

Ambient traffic on the two study roadways can be expected to increase due to regional growth and new projects in the area.

The current long range highway plan for the County of Hawai'i does not include traffic forecasts. In lieu of traffic forecasts from the current long range transportation plan, it was assumed that areal traffic would increase at the same rate as the population growth and observed traffic. The current County of Hawai'i *General Plan* forecasts that population in the South Hilo District will increase from 46,273 in 2005 to 49,791 in 2020, a 7.6% increase within 15 years. The 7.6% population growth rate for South Hilo is lower than the 36% island-wide growth rate forecast in the *General Plan* and represents an annual 0.5% growth rate. This population growth rate is also comparable to the

traffic growth rate of 0.57% observed on the north leg of Kanoelehua Avenue from 1994 to 2006.

There are several projects being considered adjacent to the study area. The County Council approved rezoning for a 20,000 square feet neighborhood commercial center on the northeast corner of West Puainako Street and Kilauea Avenue. There are several small commercial zoned properties along the east side of Kanoelehua Avenue between East Puainako Street and East Kawailani Street. In addition, the *Draft Panaewa Regional Plan* prepared by the Department of Hawaiian Home Lands discusses the infilling of the industrial lands/mixed use lands in the Panaewa region. To account for the additional traffic which would be generated from these properties, the annual ambient traffic growth rate was increased to 1.0%.

The current traffic volumes shown on **Figure 3** were increased by the 5% factor to obtain the ambient traffic forecasts shown on **Figure 7**, with traffic volumes rounded to the nearest five vph. The traffic operations for the ambient forecast conditions at the study intersections are discussed in the **Level of Service Analysis** section of this report.

The *Draft Panaewa Regional Plan* also mentions a Kamoleao Master Plan that would create a community center on the vacant lands bounded by East Puainako Street, Ohuohu Street, and Railroad Avenue, south of the Home Depot lot. This proposed project was not included in this analysis as the project is only in conceptual planning and has no development schedule.

Project Generated Traffic

The traditional three-step process of trip generation, trip distribution, and trip assignment was used to forecast future traffic that would be generated by the proposed project. The trip generation step forecasts the number of new trips that would be produced in each of the two study periods. The trip distribution step allocates these new trips by direction of travel. Finally, the trip assignment step assigns the trips to the specific turning movements at the study intersections. The traffic forecast for this report

assumed a larger 160,000 square foot Target store in place of a 120,000 square foot store assumed in the original report.

The trip generation and distribution analyses for the year 2013 are summarized on **Table 1**. The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed project during the weekday morning, weekday afternoon, and Saturday peak periods. The Institute of Transportation Engineers (ITE) Trip Generation report has trip generation rates based on square footage and the proportion of inbound/outbound trips for many different land uses including Free Standing Discount Stores (ITE Land Use 815) and Supermarkets (ITE LU 850). These rates and proportions as summarized below were used to calculate the number of morning, afternoon and midday peak hour trips as shown on **Table 1**:

2013 Rate and Proportion Summary

	Discount Store (LU 815)			Supermarket (LU 850)		
	Generation	Direction of Trips		Generation	Direction of Trips	
Peak Hour	Rate	Entering	Exiting	Rate	Entering	Exiting
Weekday Morning	0.84	66%	32%	3.25	61%	39%
Weekday Afternoon	5.06	50%	50%	10.45	51%	49%
Saturday	7.58	51%	49%	10.76	51%	49%

The proposed project is forecast to generate 327, 1,437, and 1,858 vph in the weekday morning, weekday afternoon, and Saturday midday peak hours, respectively. The 22% increase in floor area from the original report results in an 11% increase in the weekday morning peak, a 16% increase in the weekday afternoon peak, and a 19% increase on weekends. Some of these trips (10% in the morning, 15% in the afternoon and Saturday) can be expected to go between these two proposed land uses and would not generate trips external to the project site; the volume of generated trips were reduced accordingly. The actual number of trips generated in the future may be lower, based on evidence that the Home Depot store is not generating as many trips as forecasted by the Trip Generation report.

The project generated trips were then distributed to the primary directions to and from the project site based on the current traffic patterns in each peak analysis hour. It was assumed that 10% of the project generated trips would be made between the proposed project and the other retail centers on East Maka'ala Street, and would not access either Kanoelehua Avenue or Railroad Avenue. The trip distribution analysis is summarized on **Table 1**.

A unique aspect of trips generated by commercial centers is that a large portion is pass-by and diverted trips. Pass-by trips are attracted from traffic passing the site on an adjacent roadway and have direct access to the commercial center. Diverted trips are attracted from the roadways in the vicinity of, but not adjacent to, the commercial center. They require a diversion from that roadway and add traffic to streets adjacent to the site. Therefore, these trips do not add to the through volumes on the main roadway. They are added to the turning movements but are subtracted from the through movements where they turn off to access the commercial center. The proposed project is located on East Maka'ala Street, which intersects the major through route, Kanoelehua Avenue. Based on this alignment, pass-by and diverted trips were not analyzed as the same in this study.

The Institute of Transportation Engineers Trip Generation Handbook (Second Edition, 2004) provides average pass-by and diverted trip factors during the weekday afternoon peak and Saturdays for various types of commercial land uses as follows:

	AFTERNOON PEAK		SATURDAY	
LAND USE	PASS-BY	DIVERTED	PASS-BY	DIVERTED
Free Standing Discount Store (LU 815)	17%	50%	23%	23%
Supermarket (LU 850)	36%	25%	N/A	N/A

Based on this information, it was conservatively assumed that there would be 70% directly generated trips and 30% pass-by and diverted trips, although the actual rate of pass-by trips could be higher. Although no information was provided for the morning peak hour, information from other studies conducted by this consultant has indicated

that most shoppers in the morning peak hour are commuters. A 30% pass-by and diverted trip rate was assumed for the morning peak hour. The volume of pass-by trips were based on the volume of inbound trips in all three study periods.

The traffic assignment of project generated trips in each peak hour is shown on **Figure 8**. Trips from the areas north of Hilo could access the project site via East Maka'ala Street or the "back way" via Pohaku Street/Kukila Street. Trips from the south and west could access the project site via East Maka'ala Street or East Puainako Street/Ohuohu Street. These traffic volumes generated by the proposed project were added to the ambient traffic forecast volumes from **Figure 7** to obtain the total with project traffic forecasts shown on **Figure 9**, with volumes rounded to the nearest five vph. **Figure 10** shows the existing volumes and total with project traffic forecasts for the two Waiakea Center/Prince Kuhio Plaza driveways on East Maka'ala Street. The traffic operations for the total with project traffic forecast conditions are discussed in the **Level of Service Analysis** section of this report.

LEVEL OF SERVICE ANALYSIS

The concept of level of service is used to quantify the quality of traffic flow on roadway facilities. The Transportation Research Board (TRB) has developed procedures to calculate level of service value(s) by measuring traffic volumes against the capacities of different types of roadway facilities. Their Highway Capacity Manual 2000 (HCM2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc.

Signalized Intersection Analysis

The two major study intersections on Kanoelehua Avenue are currently signalized. The methodology for analyzing signalized intersections calculates the levels of service for individual movements, approaches, and the intersection as a whole based on the average stopped delay per vehicle. The results range from level of service A (best with average delays less than ten seconds) to F (worst with average delays longer than 80 seconds), described as shown on the following page.

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds/Vehicle)
A	< 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.1

The County of Hawai'i considers levels of service A to D as acceptable for signalized intersections, with levels of service E and F indicating the need for mitigation measures. A common traffic engineering practice is to provide acceptable levels of service on the main traffic movements and lower (possibly unacceptable) levels of service on minor movements such as left turn lanes to maintain an acceptable level of service for the intersection.

Tables 2, 3 and 4 summarize the signalized intersection level of service analyses conducted for the existing (2008) and forecast year (2013) when the proposed project is expected to be fully occupied. The existing year analysis includes traffic volumes from **Figure 3**. The forecast year analysis includes ambient and total with project traffic forecasts from **Figures 7** and **9**, respectively. **Table 2** compares the existing levels of service for the current design and two possible mitigation actions. **Table 3** compares the 2008 ambient and total with project levels of service with the existing design. The traffic data are placed side by side for each of the morning, afternoon and Saturday peak hours. This format facilitates a comparison of levels of service for the different forecast scenarios to give an indication of the traffic impacts of ambient traffic growth and the proposed project. **Table 4** compares the total with project traffic forecast levels of service with the existing design and possible mitigation measures. The level of service (LOS) and delay (DEL) results are shown for the entire intersection, each approach, and the left turn lane and through lanes for those approaches with separate left turn lanes, for the three sets of analyses. The worksheets for the level of service calculations are provided in **Appendix B**.

The data shown on **Table 2** indicates that the Kanoelehua Avenue/East Puainako Street intersection is currently operating at acceptable levels of service in the morning and afternoon peak periods, although the two Puainako Street approaches are operating at level of service E due to the large volume of left turns being made, indicating the need for double left turn lanes. The intersection is currently operating at an unacceptable level of service E on Saturday due to the large volumes of left turning movements being made. This deficiency adversely affects the traffic operations on the other approaches by reducing traffic signal green time.

At the request of the DOT, the impacts of two possible mitigating measures (adding a third northbound through lane on Kanoelehua Avenue and adding double left turn lanes on both approaches of Kanoelehua Avenue) were analyzed. As shown on **Table 2**, the third northbound lane would improve existing traffic operations at Puainako Street and East Maka'ala Street intersections during the weekday morning and Saturday peaks, but not during the weekday afternoon peak. During the weekday morning and Saturday periods, the addition of the third northbound through lane would allow the green time for the through traffic to be decreased and re-allocated to the side street traffic, which would improve the overall operations at the intersection. At Puainako Street, it would improve the overall intersection level of service from D to C in the morning peak and from E to D on Saturdays. There would be no change in afternoon peak level of service (D) and delays would decrease only on the northbound approach of Kanoelehua Avenue. Several approaches and movements would continue to operate at level of service E during the afternoon and Saturday peak hours.

The double left turn lanes on both approaches of Puainako Street would improve overall intersection levels of service in the morning and Saturday peak periods. It would decrease delays in the afternoon peak with no changes in levels of service. Several approaches and movements would continue to operate at level of service E during the Saturday peak period. The single through lane on the eastbound approach of Puainako Street remains a problem during the afternoon and Saturday peak periods. Widening

the eastbound approach through movement from one to two lanes would improve its traffic operations.

Table 3 indicates that the Kanoelehua Street/Puainako Street intersection with its existing design is forecast to operate at the similar levels of service for the ambient traffic conditions. Increasing the traffic signal cycle length could slightly improve traffic operations in the short term, but traffic operations could not be improved without roadway improvements.

The additional traffic generated by the proposed projects would adversely impact traffic operations at the intersection during the afternoon and Saturday peak periods, when their trip generation would be highest. The intersection level of service during the afternoon peak hour would change from D to E, and during the Saturday peak hour it would change from E to F. The impacts of several measures to mitigate these the additional project-generated traffic is summarized on **Table 4**. The addition of a third northbound lane would not in itself provide level of service D or better at the Puainako Street intersection. Neither would double left turn lanes on the two Puainako Street approaches. A combination of mitigation measures including a third northbound lane on Kanoelehua Avenue, double left turns on both approaches of Puainako Street, and a second eastbound through lane on Puainako Street, would be required to provide level of service D or better during all three study periods. However, there may not be a sufficient amount of right-of-way space to permit all three improvements.

The Kanoelehua Avenue/East Maka'ala Street intersection is currently operating at an acceptable level of service D in all three analysis periods, although several movements have unacceptable levels of service during the afternoon and Saturday peak periods. The northbound approach through lanes of Kanoelehua Avenue are operating at level of service E during the afternoon peak period since the high volume of southbound left turns decreases traffic signal green time for the northbound approach. A similar problem affects the northbound left turn lanes on Saturdays, resulting in level of service E operations.

The impact of adding a third northbound lane on Kanoelehua Avenue to existing traffic is shown on **Table 2**. It would improve the overall intersection level of service from D to C in the morning peak but the intersection would remain at level of service D during the other two periods, though with decreases in delay. The northbound left turn lanes would continue to operate at level of service E on Saturdays.

Table 3 shows that acceptable intersection levels of service can be maintained for the ambient forecast conditions with the existing design by increasing the traffic signal cycle length to accommodate the higher volumes. Two left turn movements during the afternoon peak hour and one left turn movement during the Saturday peak hour are forecast to be at level of service E.

The overall intersection levels of service are forecast to remain at acceptable levels for the weekday morning and afternoon analysis periods with the additional traffic generated by the proposed project, although several movements would be at levels of service E and F. The overall intersection level of service is forecast to be at E for the Saturday with many movements at levels E and F, indicating unacceptable conditions. As shown on **Table 4**, adding a third northbound lane at the East Maka'ala Street intersection would improve the Saturday overall intersection level of service to D, although the two Maka'ala Street approaches and the two Kanoelehua Avenue left turn lane movements would be at level of service E.

The DOT is planning for the future widening of Kanoelehua Avenue to six lanes from Volcano Road to Kamehameha Avenue by not allowing adjoining land owners to build within the future right-of-way. The third highway lane could be part of the future highway widening. Bringing the medians separating the southbound left turn lanes on Kanoelehua Avenue at Maka'ala Street and Pohaku Street to standard width and adding a third northbound lane would require a minimum of 16 feet of right-of-way and would shift the northbound lanes' travel alignment. The DOT is also including a bike lane in their planning, which would require additional right-of-way.

Table 3 also includes the results of levels of service analysis conducted for intersections that are currently unsignalized but are recommended for traffic signalization. These locations show entries under the Total with Project column only and their results are discussed in the Unsignalized Intersection Analysis section as mitigation measures.

Unsignalized Intersection Analysis

The Ohuohu Street, Railroad Avenue, and Pohaku Street intersections are currently unsignalized. The procedure used for analyzing unsignalized intersections calculates vehicle delays and levels of service based on the distribution of gaps in traffic on the major street and driver judgment in selecting gaps through which to execute turns. For two-way stop intersections where only the minor street traffic is controlled by a stop sign, level of service is calculated for the critical turning movements including outbound movements from the stop-controlled approach, and left turns from the major street to the minor street. The procedure does not calculate an overall intersection level of service. For all-way (four-way) stop intersections where all approaches are stop sign controlled, the procedure calculates level of service for each approach and the intersection as a whole.

The Highway Capacity Manual defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as follows:

LEVEL OF SERVICE	DELAY (Seconds/Vehicle)
A	< 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	> 50.1

The County of Hawai'i considers levels of service A to D as acceptable for unsignalized intersections, with levels of service E and F indicating the need for mitigating measures.

Table 5 summarizes the unsignalized intersection level of service analysis for eight study intersections. As with **Table 2** for the signalized intersection analysis, the 2008 existing and 2013 ambient and total with project traffic data are placed side by side for each of the morning, afternoon and Saturday peak hours to facilitate comparison. Levels of service and delay are given for the critical turning movements. The worksheets for the level of service calculations are provided in **Appendix C**.

The East Puainako Street/Railroad Avenue intersection is currently operating at acceptable levels of service in all three analysis periods. It is forecast to continue operating at acceptable levels of service for the ambient and total with project forecast conditions. This intersection is forecast to have a minimal increase in traffic volume with the proposed project and would not require mitigation measures.

The East Puainako Street/Ohuohu Street intersection is currently operating at acceptable levels of service and is forecast to continue operating at acceptable levels of service for the ambient forecast conditions. The Ohuohu Street northbound approach is forecast to operate at level of service E in the afternoon peak and level F during Saturday with the proposed project, indicating the need for mitigation. Creating a four-way stop would provide acceptable traffic conditions, as shown on **Table 5**.

The DOT has expressed concern that eastbound traffic on East Puainako Street and East Maka'ala Street could back up from the commercial center driveways to Kanoelehua Avenue. The Prince Kuhio Plaza driveway on East Puainako Street across Pilipaa Street has been problematic when traffic turning left into the plaza overflows the left turn lane and blocks the single through lane. The "typical" traffic engineering mitigation for this driveway problem would be to convert it into a right turn in, right turn out driveway. This mitigation strategy would eliminate the inbound left turn movement from Puainako Street, which may not be acceptable to several parties and would need to be negotiated. This action would be necessary if there were any roadway widening. The Pilipaa Street approach could remain in its present design although it may "lose" several feet.

The East Maka'ala Street/Railroad Avenue intersection is currently operating at acceptable levels of service in all three analysis periods and is forecast to continue operating at acceptable levels of service for the ambient forecast conditions. The intersection is also forecast to continue operating at acceptable levels of service for the total with project forecast conditions during the morning and afternoon peak hours. The East Maka'ala Street eastbound left turn movement is forecast to operate at level of service F on Saturdays, indicating the possible need for mitigation which could include an all-way stop or traffic signalization. The future design of the intersection and its mitigating measures, including the need for traffic signals, would be determined during the design phase.

The East Maka'ala Street/Home Depot (west) driveway is currently operating at acceptable levels of service in all three analysis periods and is forecast to continue operating at acceptable levels of service for the ambient forecast conditions. The northbound left turn movement from the Home Depot driveway is forecast to be at level of service F during the afternoon and Saturday peak periods with the additional traffic from the proposed project, indicating the need for mitigation. This situation would be similar to the current traffic operations at the driveways serving the Waiakea Center and Prince Kuhio Plaza further west on East Maka'ala Street. The northbound left turn movements from Prince Kuhio Plaza can be difficult to make during peak periods, so that drivers make a right turn movement and complete the left turn movement elsewhere.

One way to minimize the traffic impacts would be to restripe East Maka'ala Street to provide separate left turn lanes into the proposed project sites on both sides of the street, and to provide two through lanes on each side of the street. This is similar to the road striping designs serving the Waiakea Center and Prince Kuhio Plaza further west on East Maka'ala Street. The future design of the intersection and its mitigating measures would be determined during the design phase.

The East Maka'ala Street/Ohuohu Street intersection is currently operating at acceptable levels of service. The northbound movement from Ohuohu Street is forecast

to be at level of service E for the Saturday ambient forecast conditions and level F for the afternoon and Saturday total with project conditions. Creating an all-way stop for the total with project conditions would provide acceptable traffic conditions only during the weekday morning and afternoon peak hours. The Saturday peak hour conditions would be at level of service F, indicating the need for mitigating measures such as traffic signals. The future design of the intersection and the need for traffic signals would be determined during the design phase.

The two driveways serving the Prince Kuhio Plaza and Waiakea Center along East Maka'ala Street were analyzed utilizing the traffic counts taken by another study. The current morning and afternoon peak hour traffic volumes and the 2013 total with project traffic forecasts for these two intersections are shown on **Figure 10**. The level of service analysis of current traffic confirmed observations of traffic operations during the afternoon peak periods that the outbound left turn movements from these driveways are already operating at unacceptable levels of service. The traffic generated by the proposed project will increase the volume of through traffic along East Maka'ala Street and further increase delays for outbound traffic from both centers.

A possible design to mitigate the above problem would be to re-channel and install traffic signals at the two driveway intersections. The west (*mauka*) driveway could be re-designed to permit only inbound left turns and outbound right turns. The east (*makai*) driveway would be re-designed for outbound left and through and inbound right turn movements. These changes would allow a two-phase signal operation with short cycle lengths that would also minimize the eastbound traffic queues backing to Kanoelehua Avenue. The level of service analysis shown on **Table 3** indicates that the east intersection would operate at level of service A in both peak periods while the west intersections would be at level of service B as signalized intersections. The future design of these intersections and the need for traffic signals would be determined during the design phase.

The Kanoelehua Avenue/Pohaku Street intersection has three difficult turning movements. The outbound left turn movement from Pohaku Street is currently

operating at level of service F during all three analysis periods. This is a very difficult movement to make as evidenced by the few vehicles making this movement. There are high volumes of left turns being made from Kanoelehua Avenue into Pohaku Street during all three periods, especially on Saturdays. This movement is at level of service C during the morning and afternoon peak periods, and level F on Saturdays. Although level of service C is considered acceptable, observations of traffic operations at other Island of Hawai'i locations indicate that left turn movements made from main highways at levels of service B and C are difficult to make. The outbound right turn movement from Pohaku Street is currently operating at level of service C during the morning and afternoon peak periods, and level F on Saturdays. Anecdotal evidence indicates that drivers are using this intersection and Pohaku Street to access Waiakea Center to avoid the traffic congestion on East Maka'ala Street. Some of the traffic going to the proposed projects is expected to utilize Pohaku Street and Kukila Street for the same reason. Kukila Street may need to be improved to accommodate higher traffic volumes. These improvements could include widening the roadway to a 24-foot minimum and having access control, such as along Pohaku Street.

The high volumes of traffic at this intersection would probably warrant traffic signals. Traffic signals could attract more vehicles onto Pohaku Street which would affect traffic operations on Pohaku Street and Kukila Street, two unimproved two-lane local roads. If signalized, outbound left turns from Pohaku Street should be banned to permit a two-phase signal operation that would maximize the green time given the inbound left turn movement. With these design features, the intersection is forecast to operate at acceptable levels of service with the project-generated traffic as shown on **Table 3**. The feasibility and impact of installing traffic signals would be studied further in the design phase. The outbound left turn from Pohaku Street should be closed if the intersection remains unsignalized to improve traffic safety. Other considerations, such as the addition of a standard median for the southbound left turn lane, and the addition of a third northbound through lane that would terminate as a right turn only lane into Pohaku Street, would increase right-of-way requirements.

CONCLUSIONS

The proposed project consisting of a 160,000 square foot stand-alone discount superstore (Target) and a 60,000 square foot supermarket (Safeway) is expected to generate a large number of trips: 327 vph in the weekday morning, 1,437 in the weekday afternoon, and 1,858 vph in the Saturday mid-day, based on the Trip Generation report rates. The actual number of trips generated in the future may be lower, based on evidence that the Home Depot store is not generating as many trips as forecast using the Trip Generation report.

The traffic analysis indicated the need for traffic mitigation measures to accommodate the proposed project. The mitigating measures recommended at each intersection are summarized below.

Kanoelehua Avenue-Puainako Street: This intersection would require major roadway improvements to mitigate existing capacity problems and accommodate future traffic forecasts. A third northbound lane on Kanoelehua Avenue, double left turn lanes on both Puainako Street approaches, and two through lanes on the eastbound approach of West Puainako Street are needed to properly mitigate the future traffic needs at this intersection. The DOT would also like to have sidewalks and bike lanes on the east side of Kanoelehua Avenue. However, there may not be sufficient right-of-way to permit all these improvements. Also, there were very few pedestrians counted during the traffic counts.

East Puainako Street-Railroad Avenue: This intersection is not expected to have large traffic increases and would not require mitigation.

East Puainako Street-Ohuohu Street: This intersection should be converted to a four-way stop when warranted.

East Puainako Street-Pilipaa Street-Prince Kuhio Plaza driveway: The plaza driveway should be converted into a right turn in, right turn out driveway to eliminate the

problematic inbound left turn movement. The design of the Pilipaa Street approach would not change.

Kanoelehua Avenue-Maka'ala Street: This intersection is expected to accommodate future traffic with a third northbound through lane, although several movements would be below level of service D. Other considerations such as the addition of sidewalks and bike lanes as part of the highway widening, and bringing the southbound left turn lane median to a standard width would add considerably to the right-of-way requirements, as discussed for the Puainako Street intersection.

East Maka'ala Street-Railroad Avenue: Install all-way stop or traffic signals at Railroad Avenue when warranted.

East Maka'ala Street-Home Depot driveway-Proposed project driveway: The two project access intersections along East Maka'ala Street should be designed to provide separate left turn lanes and two through lanes in each direction.

East Maka'ala Street-Ohuohu Street: This intersection should be converted to an all-way stop when warranted, and monitored to determine whether/when traffic signals would be warranted. The northbound approach of Ohuohu Street should be widened to two lanes for separate right and left turn lanes.

East Maka'ala Street-Prince Kuhio Plaza driveway-Waiakea Center driveway: Re-channelize the existing driveway intersections to restrict the permitted movements at each intersection and signalize.

Access management and congestion issues along East Maka'ala Street will be addressed in the design phase. Warrants for traffic signals would be conducted during the design phase also.

Kanoelehua Avenue-Pohaku Street intersection: The need for and impact of traffic signals should be studied. The westbound left turn movement from Pohaku Street should be eliminated if the intersection remains unsignalized. If signalized, outbound

left turns from Pohaku Street should be banned to permit a two phase signal operation that would maximize the green time given the inbound left turn movement. Kukila Street may have to be improved to accommodate higher traffic volumes

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Figures

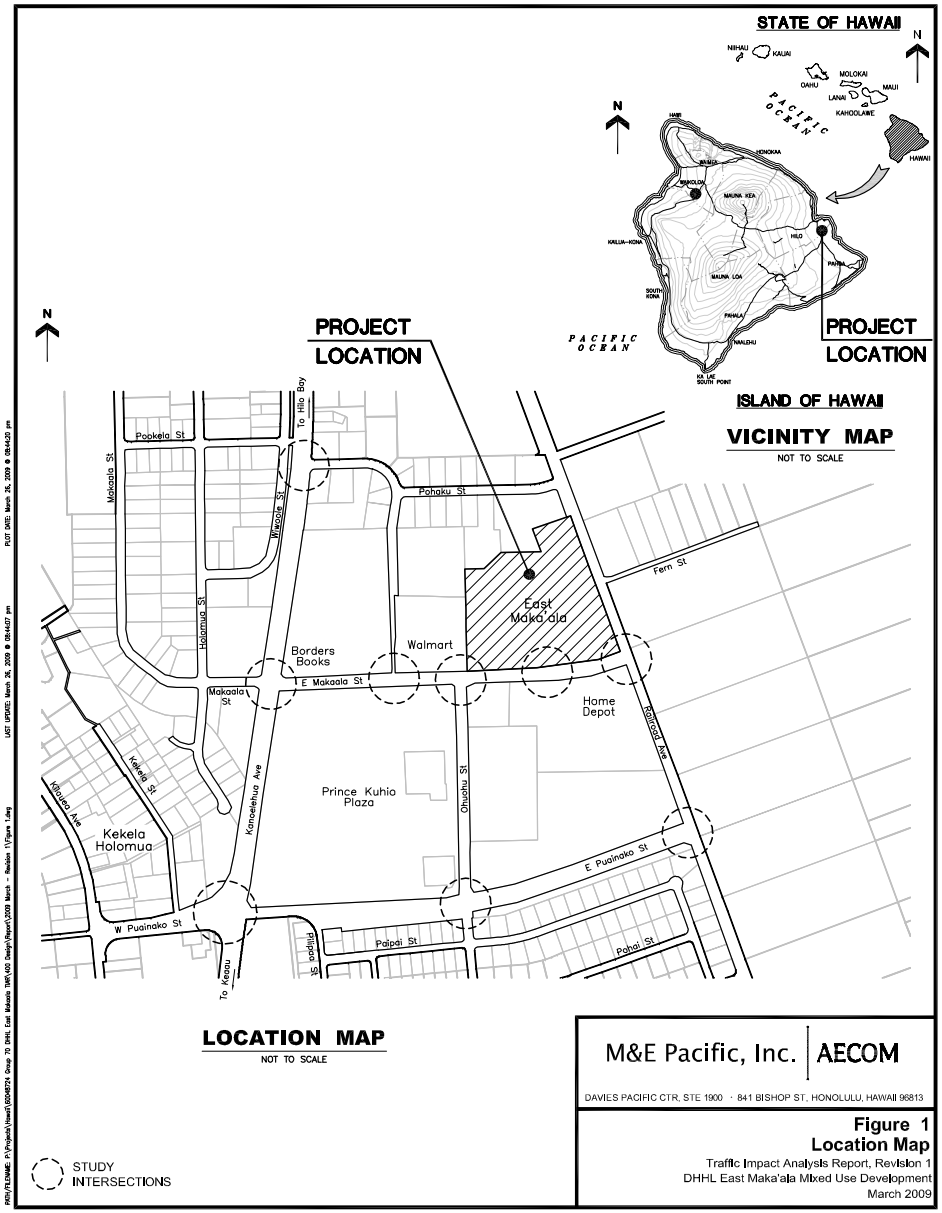

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Figure 1
Location Map
Traffic Impact Analysis Report, Revision 1
DHHL East Maka'ala Mixed Use Development
March 2009

DHHL East Maka'ala Mixed Use

Conceptual Site Plan

GROUP 70 INTERNATIONAL

14 October 2008

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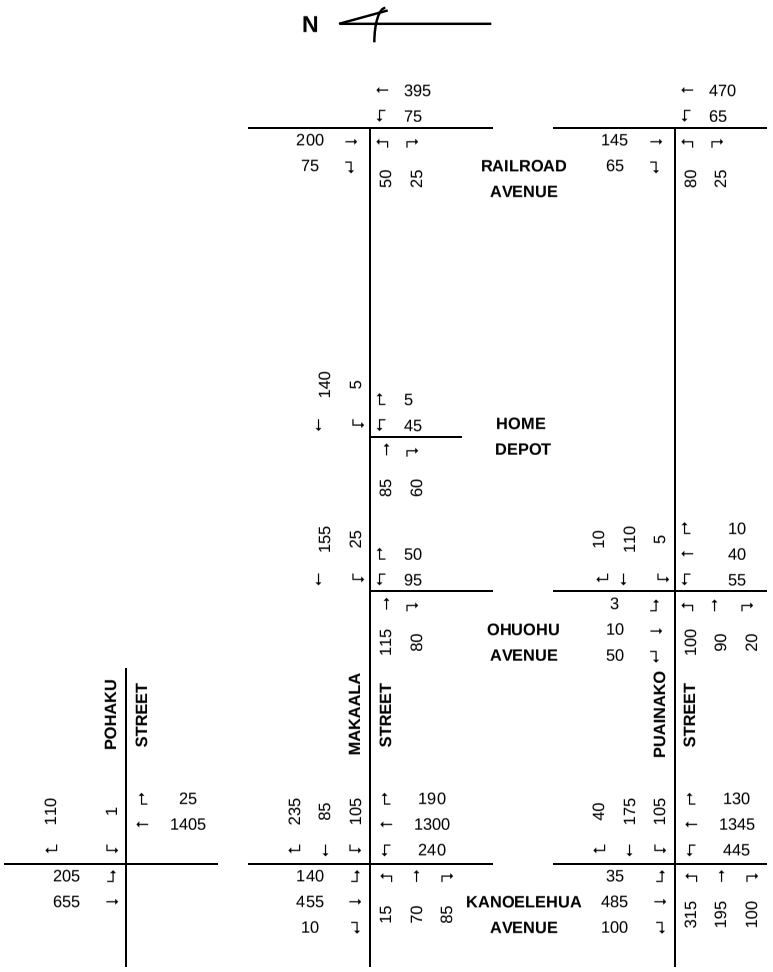
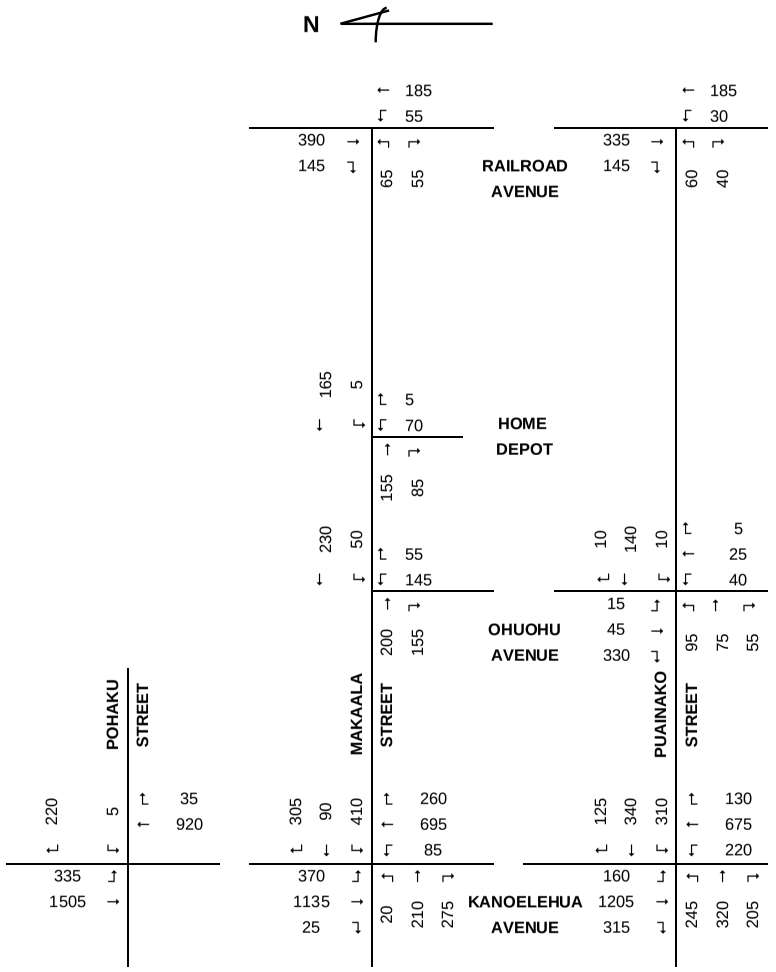
Figure 2
Conceptual Site Plan
Traffic Impact Analysis Report, Revision 1
DHHL East Maka'ala Mixed Use Development
March 2009



Not to scale

MORNING PEAK HOUR

2008 EXISTING TRAFFIC VOLUMES
FIGURE 3A



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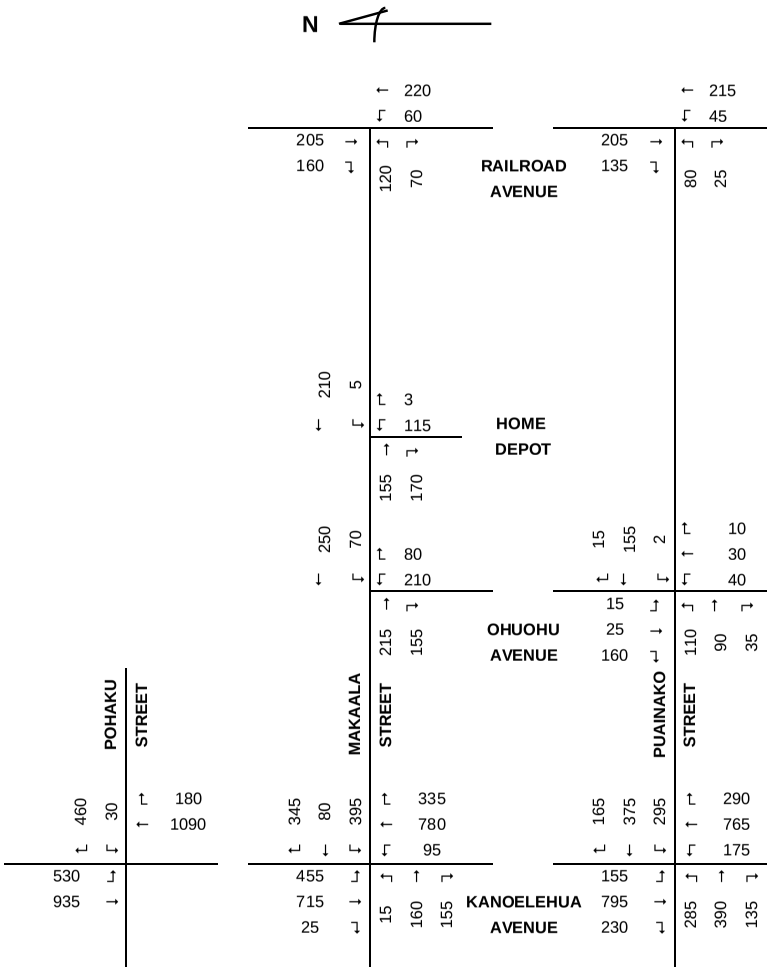
AFTERNOON PEAK HOUR

2008 EXISTING TRAFFIC VOLUMES
FIGURE 3B



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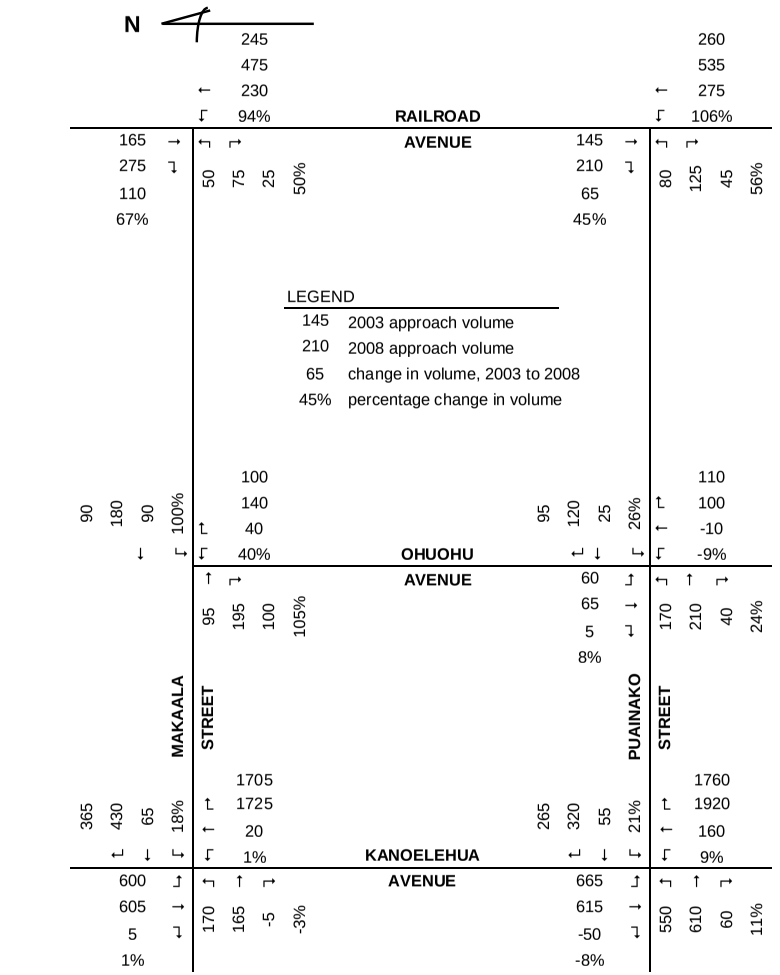
SATURDAY MID-DAY

2008 EXISTING TRAFFIC VOLUMES
FIGURE 3C



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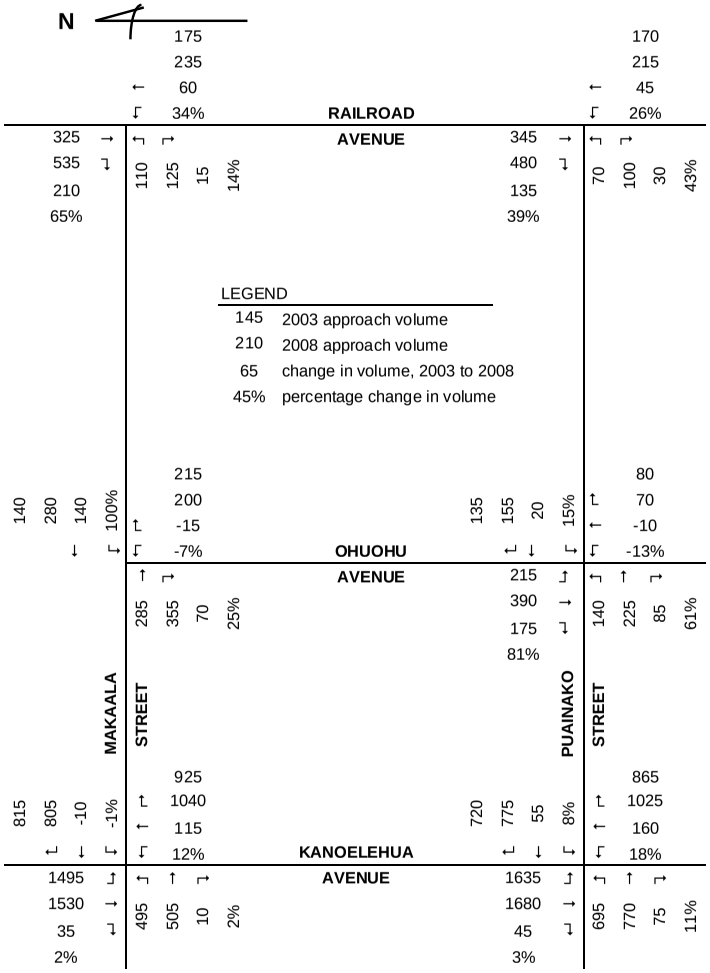
MORNING PEAK HOUR

COMPARISON OF 2003 AND 2008 PEAK HOUR VOLUMES
FIGURE 4A



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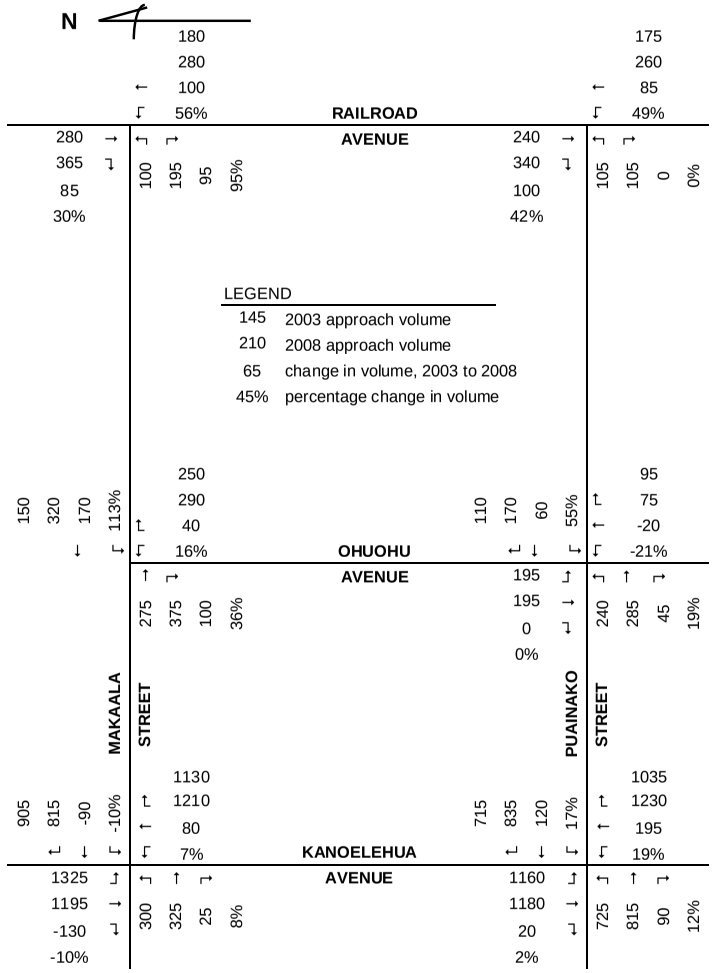
AFTERNOON PEAK HOUR

COMPARISON OF 2003 AND 2008 PEAK HOUR VOLUMES
FIGURE 4B



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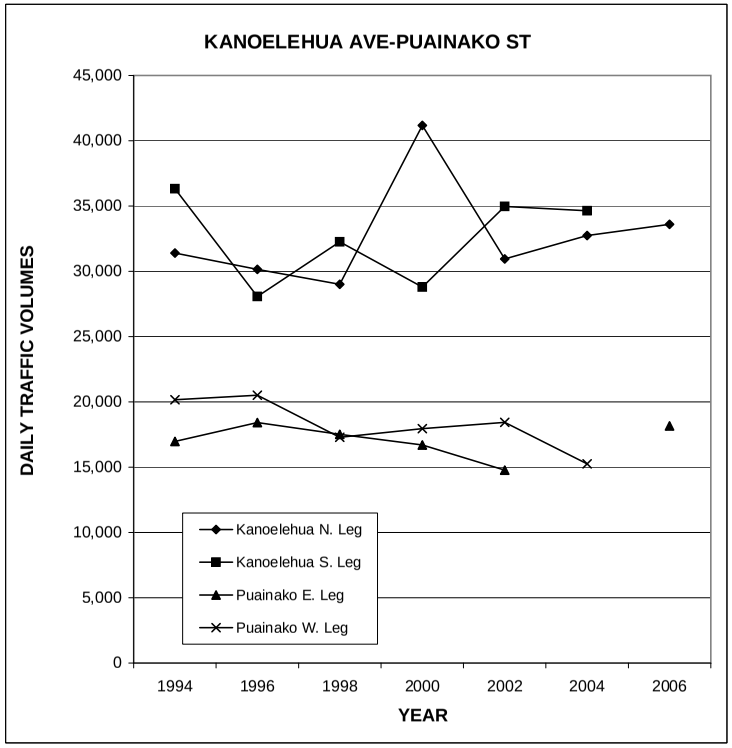
SATURDAY MID-DAY HOUR

COMPARISON OF 2003 AND 2008 PEAK HOUR VOLUMES
FIGURE 4C

YEAR	DAILY TRAFFIC VOLUMES			
	KANOELEHUA AVE		PUAINAKO ST	
	NORTH LEG	SOUTH LEG	EAST LEG	WEST LEG
1994	31,399	36,328	16,973	20,164
1996	30,146	28,078	18,418	20,514
1998	29,004	32,255	17,508	17,290
2000	41,178	28,788	16,695	17,946
2002	30,953	34,977	14,769	18,440
2004	32,740	34,644		15,252
2006	33,600		18,156	

Source: State of Hawaii Department of Transportation

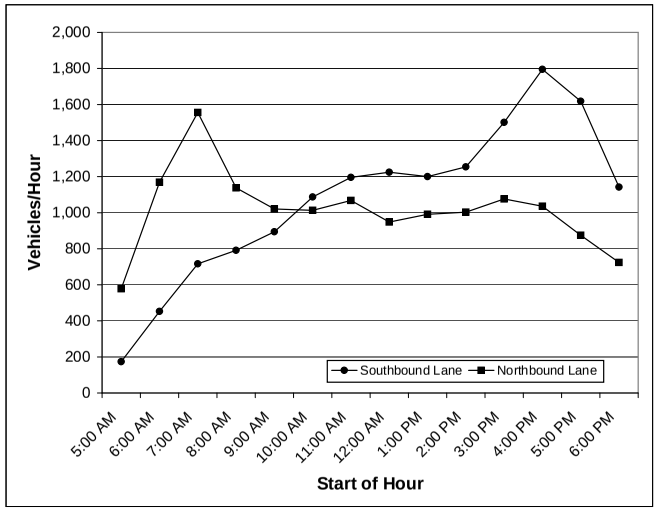


HISTORICAL TREND IN DAILY TRAFFIC VOLUMES ON KANOELEHUA AVENUE AND PUAINAKO STREET
FIGURE 5

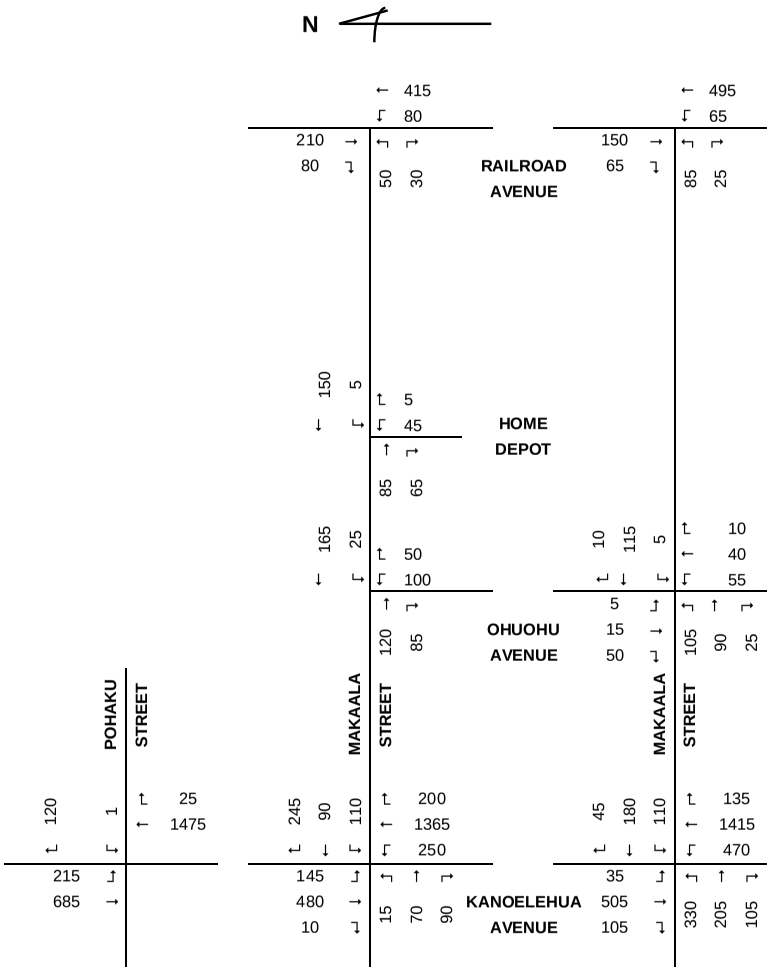
HOURLY TRAFFIC VOLUMES KANOELEHUA AVENUE NORTH OF PUAINAKO STREET (October 17-18, 2006)

Start of Hour	Vehicles/Hour Kanoelehua Ave South Bound	North Bound
5:00 AM	174	578
6:00 AM	453	1,169
7:00 AM	716	1,556
8:00 AM	791	1,138
9:00 AM	894	1,021
10:00 AM	1,087	1,013
11:00 AM	1,196	1,068
12:00 AM	1,225	948
1:00 PM	1,200	991
2:00 PM	1,254	1,003
3:00 PM	1,501	1,076
4:00 PM	1,795	1,036
5:00 PM	1,618	875
6:00 PM	1,142	724

Source: State of Hawaii Department of Transportation



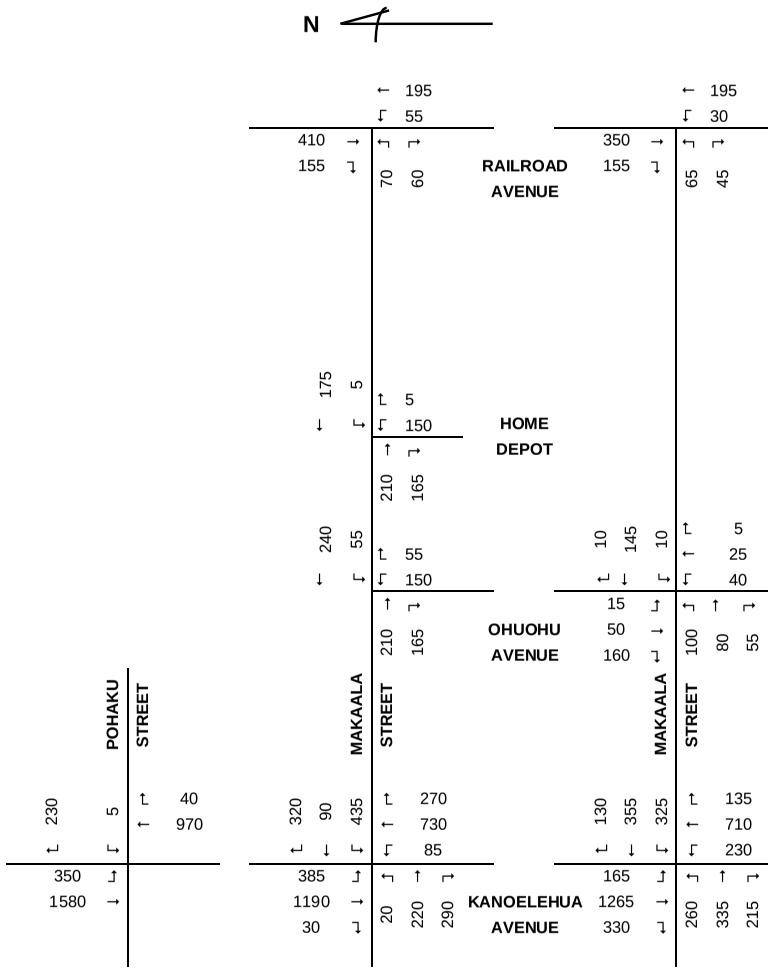
HOURLY TRAFFIC VOLUMES KANOELEHUA AVENUE NORTH OF PUAINAKO STREET
FIGURE 6



Not to scale

MORNING PEAK HOUR

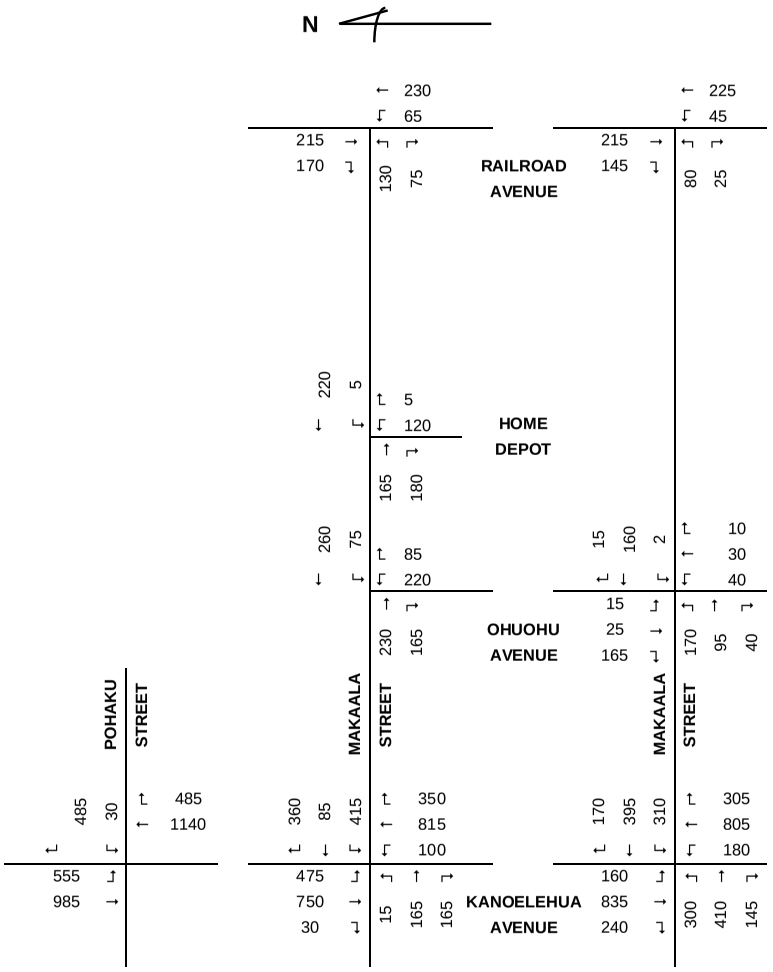
2013 AMBIENT TRAFFIC FORECAST
FIGURE 7A



Not to scale

AFTERNOON PEAK HOUR

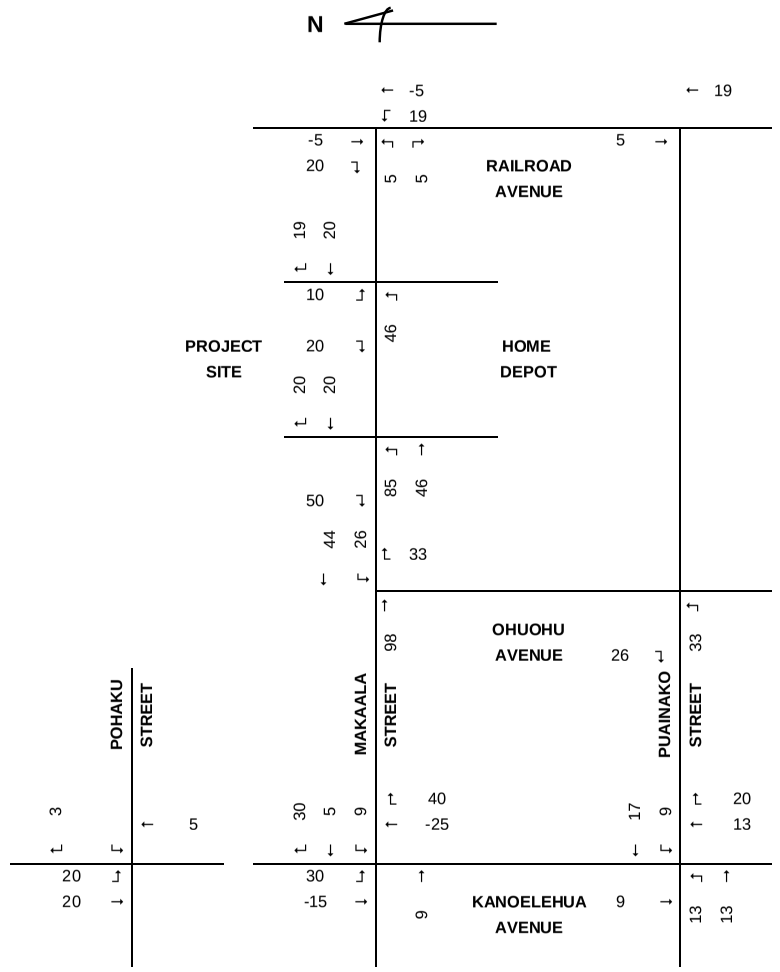
2013 AMBIENT TRAFFIC FORECAST
FIGURE 7B



Not to scale

SATURDAY MID-DAY

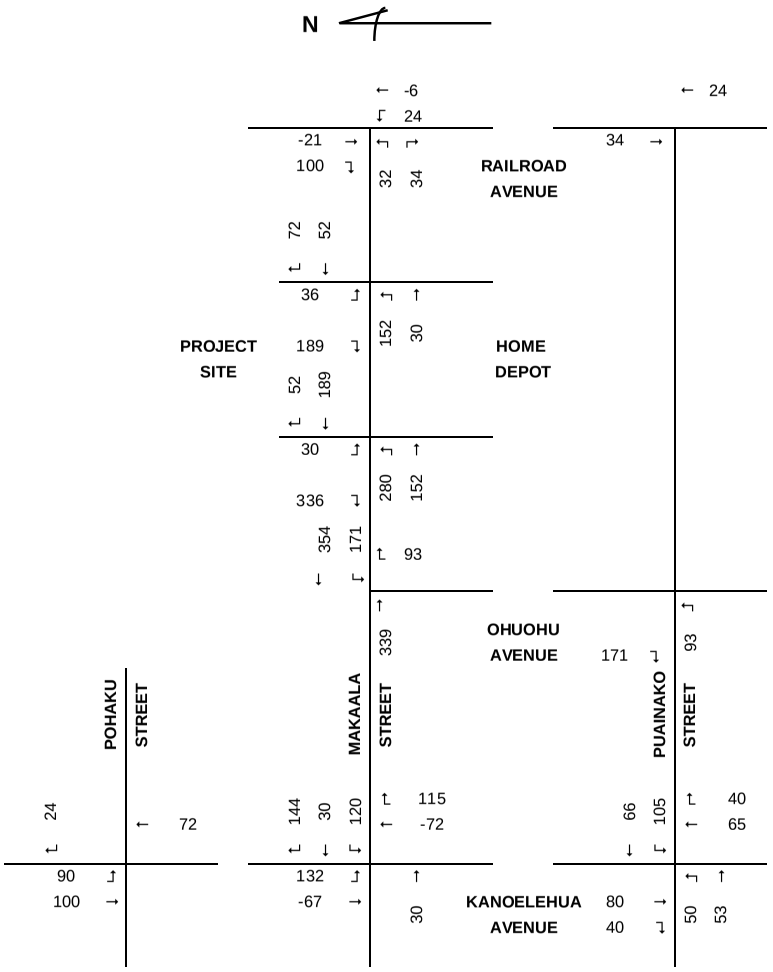
2013 AMBIENT TRAFFIC FORECAST
FIGURE 7C



Not to scale

MORNING PEAK HOUR

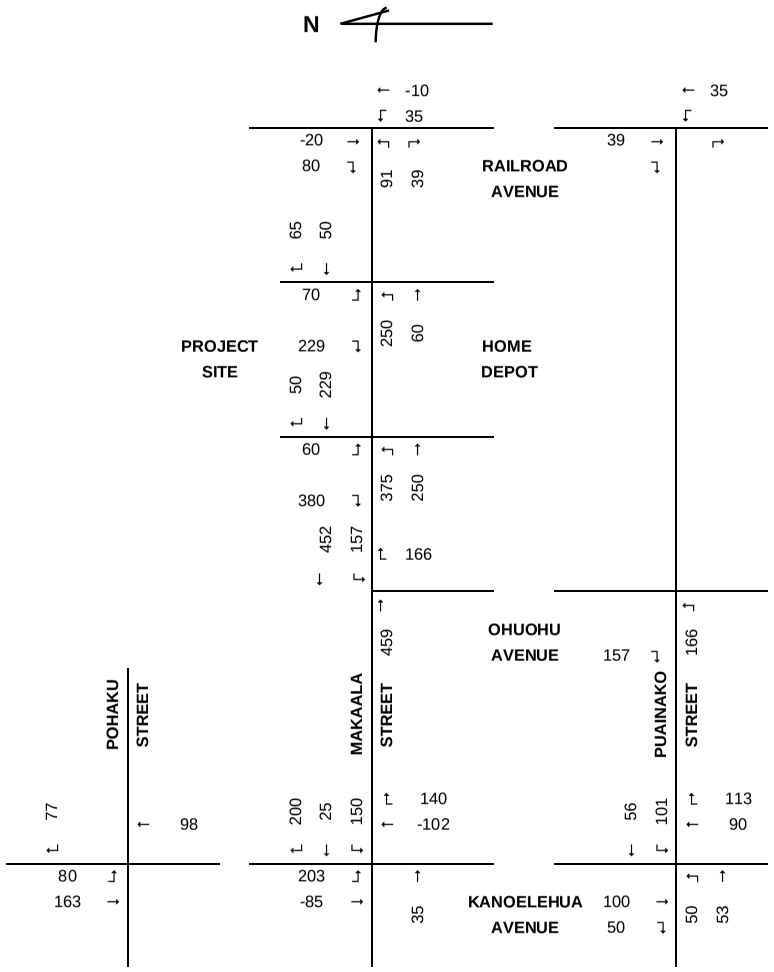
PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8A



Not to scale

AFTERNOON PEAK HOUR

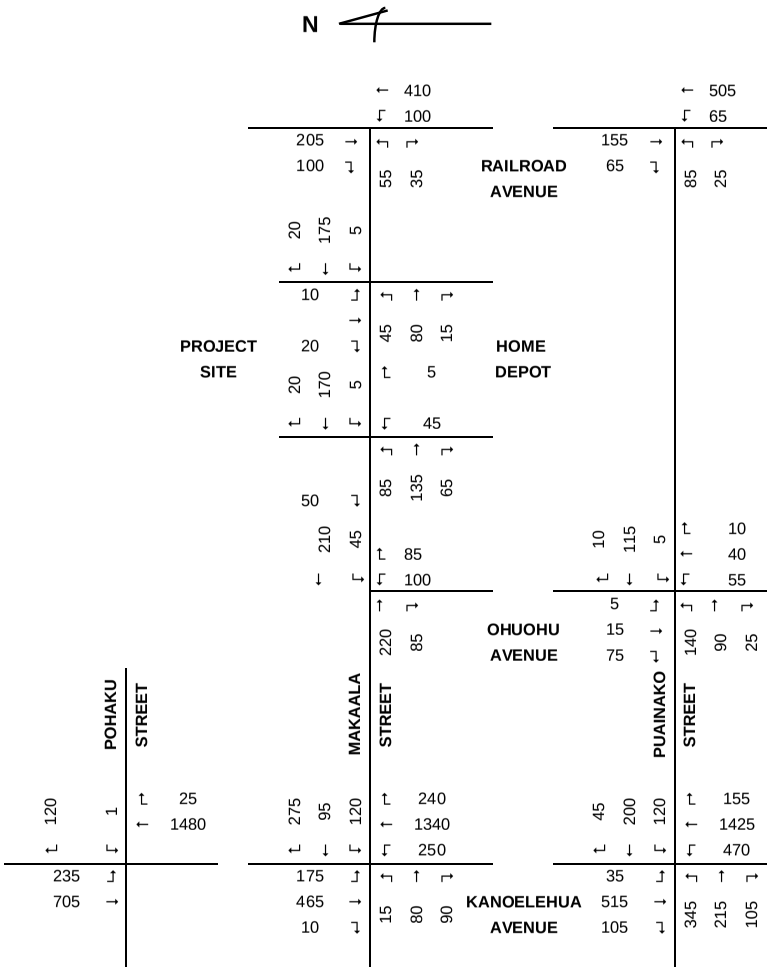
PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8B



Not to scale

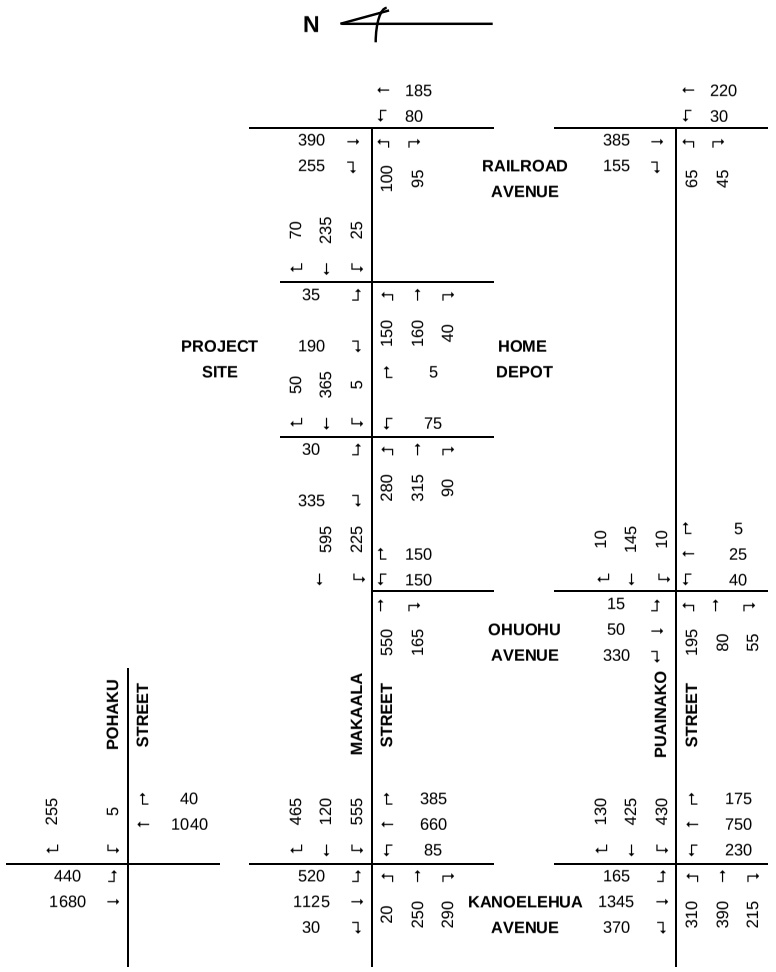
SATURDAY MID-DAY

PROJECT GENERATED TRIP ASSIGNMENT (220 ksf)
FIGURE 8C



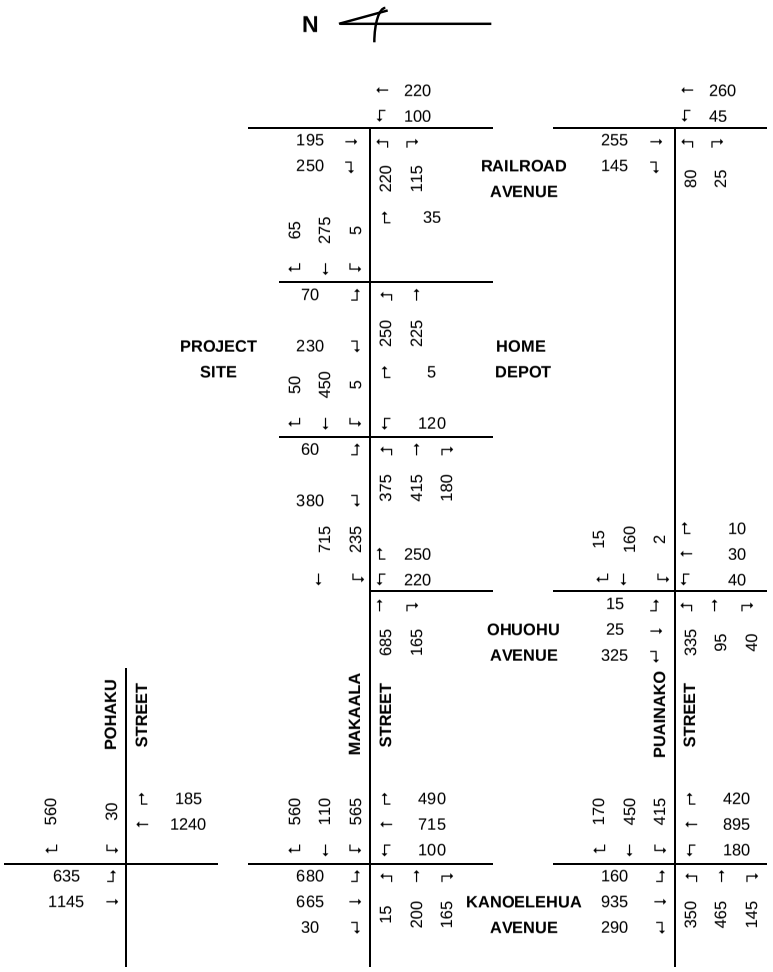
MORNING PEAK HOUR

2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9A



AFTERNOON PEAK HOUR

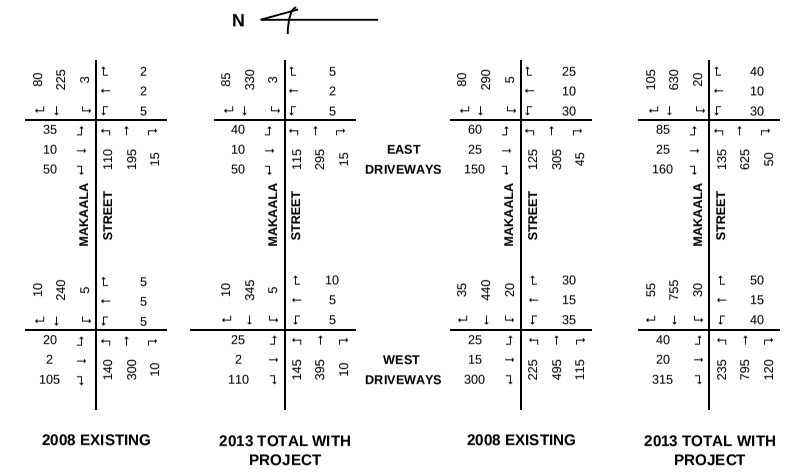
2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9B



Not to scale

SATURDAY MID-DAY

2013 TOTAL WITH PROJECT FORECAST (220 ksf)
FIGURE 9C



Not to scale

MORNING PEAK HOUR **AFTERNOON PEAK HOUR**

EAST MAKA'ALA STREET AT WAIAKEA CENTER AND PRINCE KUHIO PLAZA DRIVEWAYS
TRAFFIC VOLUMES
FIGURE 10

Tables

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Morning Peak Hour	Enter	Exit	Direction of Travel	Total # of Trips	North %	North No.	West %	West No.	South %	South No.	East %	East No.	Internal %	Internal No.
160 KSF Free Standing Discount Store														
	66%	32%												
T= 0.84(160)														
T= 134	89	43												
60 KSF Supermarket														
	61%	39%												
T= 3.25(60)														
T= 195	119	76												
Combined														
T= 327	208	119												
Less Multi-use Trips (15%)	-21	-21	Enter	187	27%	50	19%	35	25%	47	18%	34	10%	19
T= 285	187	98	Exit	98	33%	33	23%	22	18%	18	16%	16	10%	10
Pass-by Trips (30%)			Enter	50		15		11		14		10		
			Exit	50		25				15		10		
Directly generated trips			Enter	137		35		25		33		24		
			Exit	48		8		22		3		6		

TABLE 1 (continued)
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Afternoon Peak Hour	**Enter**	**Exit**	**Direction of Travel**	**Total # of Trips**	**North**		**West**		**South**		**East**		**Internal**	
					%	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**
160 KSF Free Standing Discount Store														
	50%	50%												
T= 5.06(160)														
T= 810	405	405												
60 KSF Supermarket														
	51%	49%												
T= 10.45(60)														
T= 627	320	307												
Combined														
T= 1437	725	712												
Less Multi-use Trips (15%)	-109	-109	Enter	616	36%	222	22%	133	17%	105	15%	94	10%	62
T= 1219	616	603	Exit	603	28%	168	23%	136	31%	185	9%	54	10%	60
Pass-by Trips (30%)			Enter	166		67		40		32		28		
			Exit	167		72				67		28		
Directly generated trips			Enter	450		155		93		74		66		
			Exit	436		96		136		118		26		

TABLE 1 (continued)
TRIP GENERATION AND DISTRIBUTION ANALYSIS

TRIP GENERATION			TRIP DISTRIBUTION											
Saturday Mid-day Peak	**Enter**	**Exit**	**Direction of Travel**	**Total # of Trips**	**North**		**West**		**South**		**East**		**Internal**	
					%	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**
160 KSF Free Standing Discount Store														
	51%	49%												
T= 7.58(160)														
T= 1213	619	594												
60 KSF Supermarket														
	51%	49%												
T= 10.76(60)														
T= 646	329	316												
Combined														
T= 1858	948	911												
Less Multi-use Trips (15%)	-142	-142	Enter	806	35%	283	17%	138	25%	203	13%	102	10%	81
T= 1574	806	768	Exit	768	36%	277	17%	131	26%	201	11%	83	10%	77
Pass-by Trips (30%)			Enter	218		85		41		61		30		
			Exit	217		102				85		30		
Directly generated trips			Enter	588		198		96		142		71		
			Exit	551		175		131		116		53		

TABLE 2
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing Conditions with Mitigation Measures)

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		w/3 NB Lanes		w/2 LT Lanes		EXISTING		w/3 NB Lanes		w/2 LT Lanes		EXISTING		w/3 NB Lanes		w/2 LT Lanes	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																		
OVERALL	D	41.2	C	33	C	34.5	D	48.6	D	46.5	D	40.5	E	56.7	D	54.7	D	52.2
E. Puainako St EB	E	74.8	D	45.8	D	36	E	79.6	E	79.6	D	44.4	E	68.3	E	65	E	56.2
Left Turn Lane	F	100	D	53.5	D	37.6	F	91.5	F	91.5	D	46.6	E	71.7	E	63.9	D	51.9
Through Lanes	C	33.5	C	33.5	C	33.5	E	70.6	E	70.6	D	42.7	E	65.8	E	65.8	E	59.1
E. Puainako St WB	D	48.3	D	42.4	D	42.7	D	45.8	D	45.8	C	31.4	E	58.4	D	54.2	D	46.9
Left Turn Lane	E	57.9	D	42	D	42.8	E	65.8	E	65.8	D	38.9	E	76	E	66.6	D	52.2
Through Lanes	D	42.6	D	42.6	D	42.6	C	27.7	C	27.7	C	24.6	D	44.5	D	44.5	D	42.7
Kanoelehua Ave NB	C	34.3	C	28.1	C	34.3	D	45.2	D	36.6	D	45.4	E	57.3	D	54.5	E	57.6
Left Turn Lane	D	40.6	D	40.6	D	40.6	D	43.1	D	43.1	D	43.1	E	69.7	E	69.7	E	69.7
Through Lanes	C	34	C	23.9	C	34	D	49.4	C	34.4	D	49.4	E	66	D	51	E	66
Kanoelehua Ave SB	C	29.1	C	32.3	C	29.1	D	39.7	D	39.7	D	39.7	D	46.3	D	47.8	D	46.3
Left Turn Lane	D	43.2	D	43.2	D	43.2	D	45.2	D	45.2	D	45.2	E	75.1	E	75.1	E	75.1
Through Lanes	C	28.1	C	31.5	C	28.1	D	39.1	D	39.1	D	39.1	D	40.8	D	42.5	D	40.8
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																		
OVERALL	D	35.6	C	29.4			D	49.6	D	42.8			D	43.7	D	39.5		
E. Makaala St EB	C	33.2	C	34			C	34.4	C	34.4			D	45.2	D	41.7		
E. Makaala St WB	D	39.1	D	39.1			D	51.1	D	51.1			D	48.0	D	43.5		
Kanoelehua Ave NB	C	33.9	C	24.1			E	65.8	D	39.9			D	51.2	D	43.4		
Left Turn Lane	C	33.7	D	40			D	48.8	D	48.8			E	64.0	E	58.7		
Through Lanes	D	37.3	C	21.2			E	73.8	D	38.8			D	52.4	D	41.5		
Kanoelehua Ave SB	C	38.5	D	35.2			D	42.8	D	42.8			C	33.7	C	33.6		
Left Turn Lane	D	46.6	D	46.6			D	51.1	D	51.1			D	45.5	D	42		
Through Lanes	D	36.6	C	32.4			D	40.1	D	40.1			C	26.5	C	28.5		

TABLE 3
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																		
OVERALL	D	41.2	D	47	D	47.5	D	48.6	D	52.8	F	82.4	E	56.7	E	60.4	F	91.4
E. Puainako St EB	E	74.8	E	58.4	E	57.2	E	79.6	E	73.6	F	92.6	E	68.3	E	76.6	F	>100
Left Turn Lane	F	100	E	72.3	E	69.3	F	91.5	E	71.9	F	>100	E	71.7	E	70.1	F	>100
Through Lanes	C	33.5	D	36.7	D	38.6	E	70.6	E	76.2	E	76.5	E	65.8	F	81.7	F	>100
E. Puainako St WB	D	48.3	D	46.2	D	48.4	D	45.8	D	53.5	F	96.2	E	58.4	E	58.1	F	91.9
Left Turn Lane	E	57.9	D	46.6	D	46.1	E	65.8	E	74.7	F	>100	E	76	E	74.9	F	>100
Through Lanes	D	42.6	D	46.1	D	50	C	27.7	C	34.7	C	34.9	D	44.5	D	44.8	D	39.3
Kanoelehua Ave NB	C	34.3	D	48.5	D	49.2	D	45.2	D	52.5	F	85.1	E	57.3	E	64.3	F	86.4
Left Turn Lane	D	40.6	D	46.3	D	46.3	D	43.1	D	52.8	E	60.2	E	69.7	E	67.4	E	68.1
Through Lanes	C	34	D	51.8	D	53.5	D	49.4	E	56.6	F	>100	E	66	E	77.5	F	>100
Kanoelehua Ave SB	C	29.1	C	31	C	31	D	39.7	D	44	E	67.3	D	46.3	D	45.6	D	46.5
Left Turn Lane	D	43.2	D	45.8	D	45.8	D	45.2	D	51.1	E	56.4	E	75.1	E	73.4	E	74.6
Through Lanes	C	28.1	C	30	C	30.1	D	39.1	D	43.4	E	67.9	D	40.8	D	40.2	D	42.2
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																		
OVERALL	D	35.6	D	41.2	D	39.4	D	49.6	D	49.1	D	57.1	D	43.7	D	45.4	E	60.1
E. Makaala St EB	C	33.2	C	34.7	D	35.8	C	34.4	D	46.2	D	52.7	D	45.2	D	48.2	D	52.0
E. Makaala St WB	D	39.1	D	35.1	D	35.9	D	51.1	D	52.4	E	73.6	D	48.0	D	52.9	F	80.1
Kanoelehua Ave NB	C	33.9	D	43.7	D	39.6	E	65.8	D	52.3	D	48.8	D	51.2	D	51.4	D	45
Left Turn Lane	C	33.7	D	37.8	D	37.8	D	48.8	E	55.6	E	66.5	E	64.0	E	70.3	E	69.2
Through Lanes	D	37.3	D	49.2	D	45	E	73.8	D	54.2	E	58.8	D	52.4	D	52.2	E	56.5
Kanoelehua Ave SB	D	38.5	D	39.5	D	41.6	D	42.8	D	46.3	D	53.4	C	33.7	C	34.5	E	58.6
Left Turn Lanes	D	46.6	D	51	E	57.1	D	51.1	E	62	F	84.4	D	45.5	D	48.3	F	86.6
Through Lanes	D	36.6	D	36.1	D	35.8	D	40.1	D	41.2	D	39.9	C	26.5	C	26	C	30.7

TABLE 3 (CONTINUED)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR			SATURDAY PEAK HOUR		
	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL
APPROACH	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY
KANOELEHUA AVENUE/EAST POHAKU STREET INTERSECTION									
OVERALL			B 11.9			B 12.5			C 27.4
Pohaku St WB Right			C 33.9			C 34.2			D 42.5
Kanoelehua Ave NB			B 11.4			B 15.4			D 36.2
Kanoelehua Ave SB			A 10			A 8.4			B 15.9
Left Turn Lanes			D 39.7			D 41.9			D 44.3
Through Lanes			A 0.2			A 0.4			A 0.1
EAST MAKAALA STREET/WALMART EAST DRIVEWAY									N/A
OVERALL			A 7.2			A 8.4			
Makaala St EB			A 5.8			A 6.6			
Makaala St WB			A 6			A 6.8			
Prince Kuhio East DW NB			B 18.4			B 17.5			
Left Turn Lane			B 14.1			B 14.6			
Through Lane			C 26.2			C 26.5			
Walmart East DW SB			B 16.7			B 18.3			
Left Turn Lane			B 14.6			B 15.2			
Through Lane			C 26.4			C 27.2			

TABLE 3 (CONTINUED)
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Existing and Forecast Traffic Conditions with Current Design)

INTERSECTION	AM PEAK HOUR			PM PEAK HOUR			SATURDAY PEAK HOUR		
	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL	EXISTING	AMBIENT	TOTAL
APPROACH	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY	LOS DELAY
EAST MAKAALA STREET/WALMART WEST DRIVEWAY									
OVERALL			B 12.1			B 13.6			N/A
Makaala St EB			B 13.2			B 13.7			
Left Turn Lane			B 19.4			C 23.6			
Though/Right lanes			A 7.6			A 9.3			
Makaala St WB			B 8			A 9.6			
Left Turn Lane			B 19.3			B 19.8			
Though/Right lanes			A 7.7			A 8.8			
Prince Kuhio East DW NB			B 19.5			C 20.3			
Walmart East DW SB			B 16.5			B 19.4			

TABLE 4
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS
(Total with Project Forecast with Mitigation Measures)

INTERSECTION	MORNING PEAK HOUR								AFTERNOON PEAK HOUR								SATURDAY PEAK HOUR							
	NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT		NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT		NO MIT.		3 NB LANES		2 LT LANES		3NB, 2LT	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
KANOELEHUA AVENUE/EAST PUAINAKO STREET INTERSECTION																								
OVERALL	D	47.5	D	35.1	D	44	C	33.6	F	82.4	E	72.8	E	65.7	D	43.9	F	91.4	E	71.4	E	61.2	D	47.3
E. Puainako St EB	E	57.2	D	41.1	D	36.8	C	32.4	F	92.6	F	92.6	E	63.3	D	45.0	F	>100	F	>100	E	76.1	D	48.7
Left Turn Lane	E	69.3	D	42.7	D	35.7	C	31.2	F	>100	F	>100	D	47.4	D	41.7	F	>100	F	>100	E	75.9	D	55.0
Through Lanes	D	38.6	D	38.6	D	38.6	C	34.3	E	76.5	E	76.5	E	76.5	D	47.8	F	>100	F	>100	E	76.6	D	44.1
E. Puainako St WB	D	48.4	D	45.7	D	46.7	D	45	F	96.2	F	96.2	D	40.1	D	38.9	F	91.9	E	73.6	D	45.8	D	41.7
Left Turn Lane	D	46.1	D	38.6	D	41.3	D	36.9	F	>100	F	>100	D	45.3	D	39.3	F	>100	F	>100	E	57.2	D	47.3
Through Lanes	D	50	D	50	D	50	D	50	C	34.9	C	34.9	C	34.9	D	38.5	D	39.3	D	39.3	D	35.3	D	36.6
Kanoelehua Ave NB	D	49.2	C	31.7	D	49.2	C	31.7	F	85.1	D	50.3	F	85.1	D	43.4	F	86.4	D	51.5	E	71.9	D	49.6
Left Turn Lane	D	46.3	D	46.3	D	46.3	D	46.3	E	60.2	E	60.2	E	60.2	D	52.5	E	68.1	E	68.1	F	99.6	E	75.9
Through Lanes	D	53.5	C	29	D	53.5	C	29	F	>100	D	48.6	F	99.9	D	41.7	F	>100	E	57.4	F	83.4	D	53.1
Kanoelehua Ave SB	C	31	C	35	C	31	C	35	E	67.3	E	66.6	E	67.3	D	46.5	D	46.5	D	49	D	48.8	D	47.7
Left Turn Lane	D	45.8	D	45.8	D	45.8	D	45.8	E	56.4	D	56.4	E	56.4	D	48.5	E	74.6	E	74.6	F	>100	F	83.8
Through Lanes	C	30.1	C	34.5	C	30.1	C	34.5	E	67.9	D	67.9	E	67.9	D	46.3	D	42.2	D	45.2	D	39.4	D	42.2
KANOELEHUA AVENUE/EAST MAKAALA STREET INTERSECTION																								
OVERALL	D	39.4	C	29.3					D	57.1	D	50					E	60.1	D	52.1				
E. Makaala St EB	D	35.8	D	35.8					D	52.7	E	55.3					D	52.0	E	58.3				
E. Makaala St WB	D	35.9	D	35.9					E	73.6	E	58.9					F	80.1	E	57.4				
Kanoelehua Ave NB	D	39.6	C	22.7					D	48.8	D	43.2					D	45	D	42.5				
Left Turn Lane	D	37.8	D	37.8					E	66.5	E	72.8					E	69.2	E	76.8				
Through Lanes	D	45	C	22.6					E	58.8	D	48.8					E	56.5	D	50.8				
Kanoelehua Ave SB	D	41.6	D	41.6					D	53.4	D	47					E	58.6	D	54.6				
Left Turn Lanes	E	57.1	E	57.1					F	84.4	E	65.9					F	86.6	E	75.8				
Through Lanes	D	35.8	D	35.8					D	39.9	D	38.5					C	30.7	C	33.8				

TABLE 5
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST PUAINAKO STREET/RAILROAD AVENUE INTERSECTION																		
Puainako St EB Right Turn	C	21.3	C	23.2	C	23.8	C	16.5	C	16.6	C	18.5	C	15.2	C	16.7	C	17.9
Puainako St EB Left Turn	A	9.4	A	9.5	A	9.5	B	11.5	B	11.7	B	12.0	B	10.1	B	10.2	B	10.4
Railroad Ave NB Left Turn	A	7.9	A	7.9	A	7.9	A	8.6	A	8.7	A	8.8	A	8.2	A	8.3	A	8.3
EAST PUAINAKO STREET/OHUOHU AVENUE INTERSECTION																		
Ohuohu St NB	C	15.6	C	16.3	C	19.2	C	19.0	C	20.5	F	56.0	C	24.1	D	27.1	F	<100
Ohuohu St SB	B	10.4	B	10.5	B	10.7	B	13.4	B	13.9	C	21.5	B	13.3	B	14.0	D	26.7
Puainako St EB Left Turn	A	7.7	A	7.7	A	7.8	A	7.8	A	7.8	A	8.0	A	8.0	A	8.0	A	8.6
Puainako St WB Left Turn	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5	A	7.5
EAST PUAINAKO STREET/OHUOHU AVENUE INTERSECTION WITH 4 WAY STOP																		
OVERALL					A	9.2					B	12.0					C	15.3
Puainako St EB					A	9.7					B	12.3					C	19.4
Puainako St WB					A	9.4					B	11.6					B	12.9
Ohuohu St NB					A	8.9					A	9.3					A	9.5
Ohuohu St SB					A	8.1					B	12.4					B	12.4

TABLE 5 (CONTINUED)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST MAKAALA STREET/RAILROAD AVENUE INTERSECTION																		
Makaala St EB Right Turn	A	9.8	A	9.9	A	10.0	B	12.3	B	12.6	B	13.6	B	10.6	B	10.8	B	11.4
Makaala St EB Left Turn	C	19.8	C	21.3	C	23.4	C	19.9	C	21.5	D	29.8	C	19.4	C	21.0	F	51.6
Railroad Ave NB Left Turn	A	8.1	A	8.1	A	8.3	A	8.9	A	9.0	A	9.6	A	8.3	A	8.4	A	8.8
EAST MAKAALA STREET/HOME DEPOT ACCESS/PROPOSED PROJECT ACCESS																		
Home Depot DW NB LR	B	10.1	B	10.2	B	14.3	B	11.4	B	11.6	F	>100	B	13.1	B	13.5	F	>100
Prop. Project DW SB LR					A	9.2					C	17.6					F	73.4
Makaala St EB Left Turn					A	7.9					A	9.6					B	11.1
Makaala St WB Left Turn	A	7.6	A	7.6	A	7.7	A	7.8	A	7.9	A	8.3	A	8.1	A	8.1	A	9.0
EAST MAKAALA STREET/OHUOHU AVENUE INTERSECTION																		
Ohuohu St NB	B	11.4	B	11.7	B	14.4	C	17.7	C	19.2	F	>100	D	30.6	E	37.7	F	>100
Makaala St WB Left Turn	A	7.7	A	7.8	A	8.1	A	8.3	A	8.4	B	11.3	A	8.4	A	8.5	B	12.9
EAST MAKAALA STREET/OHUOHU AVENUE INTERSECTION WITH 3 WAY STOP																		
OVERALL					A	9.6					C	25.0					F	53.3
Makaala St EB					A	9.6					C	23.3					F	51.8
Makaala St WB					A	9.9					D	32.1					F	81.3
Ohuohu St NB					A	9.2					A	9.7					B	11.9

TABLE 5 (CONTINUED)
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

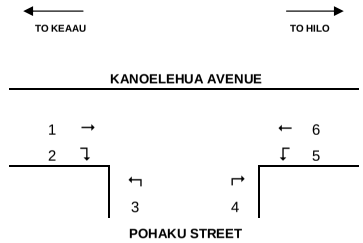
INTERSECTION	AM PEAK HOUR						PM PEAK HOUR						SATURDAY PEAK HOUR					
	EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL		EXISTING		AMBIENT		TOTAL	
APPROACH	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY
EAST MAKAALA STREET/WALMART EAST DRIVEWAY																		
PK Mall NB through/right	B	13.6	B	14	B	12.3	B	13.6	B	14	D	25.3				N/A		
PK Mall NB Left Turn	C	16.6	C	17.4	C	21.4	D	32.5	E	36.8	F	>100						
Walmart West SB Right Tu	B	11.4	B	11.8	B	13.2	C	15.1	C	16.1	F	56.8						
Walmart West SB Left/Thr	C	17.9	C	18.8	C	24.1	D	29.2	D	32.7	F	>100						
Makaala St EB Left Turn	A	8.3	A	8.4	A	8.7	A	8.6	A	8.7	B	10.5						
Makaala St WB Left Turn	A	7.7	A	7.8	A	8	A	8.1	A	8.2	A	9.3						
EAST MAKAALA STREET/WALMART WEST DRIVEWAY																		
PK Mall NB through/right	B	14.1	B	14.6	B	14.7	D	31.2	E	37.2	F	>100				N/A		
PK Mall NB Left Turn	C	22.4	C	23.8	D	29.8	F	>100	F	65.8	F	>100						
Walmart West SB Right Tu	A	10	B	10.1	B	10.7	D	32.1	E	44.5	F	>100						
Walmart West SB Left/Thr	C	20.1	C	21.3	D	27.1	F	86	F	>100	F	>100						
Makaala St EB Left Turn	A	8.2	A	8.3	A	8.6	A	9.6	A	9.8	B	12.4						
Makaala St WB Left Turn	A	8	A	8.1	A	8.3	A	9.1	A	9.2	B	10.7						
KANOELEHUA AVENUE/POHAKU STREET INTERSECTION																		
Pohaku St WB Right Turn	C	21.9	C	24.1	C	24.5	C	18.6	C	20.3	C	24.7	F	>100	F	>100	F	>100
Pohaku St WB Left Turn	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100	F	>100
Kanoelehua Ave NB Left T	C	24.8	D	29.6	D	33.8	C	17.9	C	20.5	D	37.5	F	>100	F	>100	F	>100

Appendix A

Traffic Turning Movement Counts

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Kanoelehua Avenue / Pohaku Street
DATE: Tuesday, October 14, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER:
RECORDER: Carole Darby

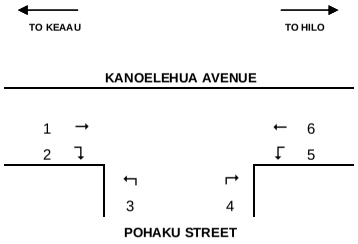


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
6:00-6:15a	127	2	0	5	18	60	212
6:15-6:30a	180	5	0	10	19	72	286
6:30-6:45a	219	5	0	15	35	95	369
6:45-7:00a	303	16	0	30	47	92	488
7:00-7:15a	300	8	0	27	38	111	484
7:15-7:30a	344	8	1	20	39	163	575
7:30-7:45a	387	1	0	30	46	153	617
7:45-8:00a	395	6	0	30	62	159	652
8:00-8:15a	277	11	0	32	58	178	556
8:15-8:30a	228	12	1	39	64	176	520
6:00-8:30a	2760	74	2	238	426	1259	4759
7:15-8:15a	1403	26	1	112	205	653	2400
PHF	0.89		0.94		0.91		

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
2:00-2:15p	241	10	1	62	75	221	610
2:15-2:30p	220	6	2	46	79	293	646
2:30-2:45p	262	4	0	42	76	292	676
2:45-3:00p	252	13	1	58	97	324	745
3:00-3:15p	272	9	0	68	121	302	772
3:15-3:30p	307	12	4	60	81	322	786
3:30-3:45p	244	6	6	54	84	303	697
3:45-4:00p	261	8	1	33	104	344	751
4:00-4:15p	250	13	2	65	90	358	778
4:15-4:30p	212	10	2	57	88	363	732
4:30-4:45p	205	10	0	53	82	373	723
4:45-5:00p	255	3	2	43	74	412	789
5:00-5:15p	219	10	1	35	74	347	686
5:15-5:30p	202	4	0	32	79	318	635
2:00-5:30p	3402	118	22	708	1204	4572	10026
4:00-5:00p	922	36	6	218	334	1506	3022
PHF	0.93		0.84		0.95		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

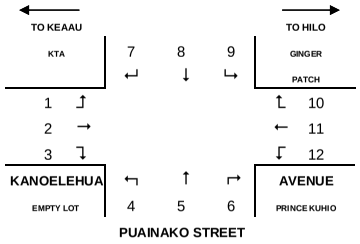
LOCATION: Kanoelehua Avenue / Pohaku Street
DATE: Saturday, September 20, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER:
RECORDER:



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
9:00-9:15a	285	24	7	44	126	185	671
9:15-9:30a	162	8	3	23	52	128	376
9:30-9:45a	151	17	1	25	81	153	428
9:45-10:00a	131	12	4	36	92	171	446
10:00-10:15a	215	21	3	51	113	135	538
10:15-10:30a	103	7	5	40	123	130	408
10:30-10:45a	165	2	1	30	51	102	351
10:45-11:00a	210	33	6	31	105	135	520
11:00-11:15a	230	23	4	32	112	188	588
11:15-11:30a	250	12	2	32	119	240	655
11:30-11:45a	297	22	3	70	98	252	742
11:45-12:00n	293	21	6	80	117	276	793
12:00-12:15p	253	53	7	128	153	262	856
12:15-12:30p	268	61	6	86	162	184	767
12:30-12:45p	279	47	7	113	47	248	741
12:45-1:00p	288	17	8	133	168	243	857
9:00a-1:00p	3580	380	73	954	1719	3032	9737
12:00n-1:00p	1088	178	28	460	530	937	3221
PHF	0.96				0.89		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Puainako Street / Kanoelehua Avenue
DATE: Tuesday, September 23, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby

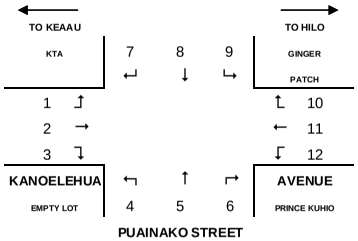


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:00-6:15a	26	155	15	8	10	3	13	34	51	8	46	2	371
6:15-6:30a	62	206	33	14	26	3	19	23	34	27	45	5	497
6:30-6:45a	82	233	44	9	26	4	20	21	46	9	62	13	569
6:45-7:00a	82	249	38	26	27	14	20	59	73	14	72	2	676
7:00-7:15a	136	352	41	27	41	13	28	54	77	16	102	6	893
7:15-7:30a	104	321	22	33	54	6	22	35	62	22	136	9	826
7:30-7:45a	104	353	26	22	44	10	28	42	95	29	124	8	885
7:45-8:00a	102	321	39	22	34	13	24	63	82	32	121	12	865
8:00-8:15a	86	261	37	31	48	13	21	54	80	24	146	13	814
8:15-8:30a	52	225	33	27	44	11	16	43	61	39	130	12	693
6:00-8:30a	836	2676	328	219	354	90	211	428	661	220	984	82	7089
7:00-8:00a	446	1347	128	104	173	42	102	194	316	99	483	35	3469
PHF	0.99			0.86			0.91			0.92			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
2:00-2:15p	53	179	33	86	84	35	35	69	51	72	249	28	974
2:15-2:30p	65	182	42	86	69	23	29	67	67	66	235	27	958
2:30-2:45p	48	171	57	67	54	22	37	75	68	48	220	33	900
2:45-3:00p	57	179	47	64	60	16	41	97	71	62	219	29	942
3:00-3:15p	40	164	36	79	78	27	51	56	62	99	253	34	979
3:15-3:30p	48	183	41	73	73	27	49	77	69	55	236	37	968
3:30-3:45p	49	190	31	62	93	33	49	91	57	73	266	40	1034
3:45-4:00p	74	172	34	91	86	31	47	82	78	79	287	43	1104
4:00-4:15p	49	162	34	74	82	23	47	73	61	86	339	38	1068
4:15-4:30p	48	151	29	81	79	39	63	74	50	75	315	37	1041
4:30-4:45p	39	143	28	78	74	21	56	60	47	91	347	40	1024
4:45-5:00p	42	138	42	70	56	20	48	72	65	87	354	39	1033
5:00-5:15p	42	122	38	80	86	21	58	52	49	64	343	27	982
5:15-5:30p	31	109	21	72	41	12	57	68	52	65	271	34	833
2:00-5:30p	685	2245	513	1063	1015	350	667	1013	847	1022	3934	486	13840
3:30-4:30p	220	675	128	308	340	126	206	320	246	313	1207	158	4247
PHF	0.95			0.93			0.98			0.91			

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

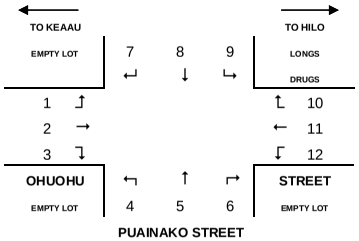
LOCATION: Puainako Street / Kanoelehua Avenue
DATE: Saturday, September 27, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Clear
RECORDER: Carole Darby



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
9:00-9:15a	39	200	66	36	57	19	24	53	59	44	129	16	742
9:15-9:30a	64	185	58	31	53	15	15	71	62	48	110	14	726
9:30-9:45a	47	194	81	41	51	16	25	67	73	53	140	20	808
9:45-10:00a	54	185	67	36	65	21	21	98	74	50	152	25	848
10:00-10:15a	42	184	74	62	62	33	12	125	81	53	166	42	936
10:15-10:30a	39	195	78	45	91	38	19	86	69	62	170	25	917
10:30-10:45a	34	203	72	60	87	38	10	79	53	60	159	33	888
10:45-11:00a	30	180	68	62	82	33	23	94	67	62	157	30	888
11:00-11:15a	36	191	73	60	90	36	24	100	62	74	171	34	949
11:15-11:30a	41	202	78	58	97	39	25	105	57	86	184	38	1010
11:30-11:45a	38	189	58	73	97	41	32	104	77	76	154	33	972
11:45-12:00n	37	193	72	80	92	34	10	81	65	55	160	38	917
12:00-12:15p	46	203	75	74	88	40	36	91	75	66	180	34	1008
12:15-12:30p	40	185	69	70	95	36	39	104	83	56	213	45	1035
12:30-12:45p	42	190	71	78	94	43	35	98	68	62	192	34	1007
12:45-1:00p	45	189	76	75	99	45	27	98	61	46	212	41	1014
9:00a-1:00p	673.5	3068	1136	941	1300	527	377	1454	1086	953	2649	502	14665
12:00n-1:00p	173	767	291	297	376	164	137	391	287	230	797	154	4064
PHF	0.95			0.96			0.90			0.94			

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Puainako Street / Ohuohu Street
DATE: Thursday, September 25, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby

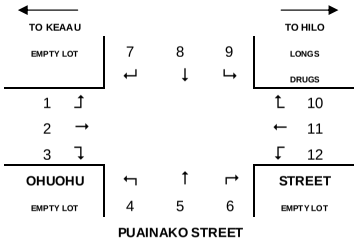


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:00-6:15a	0	1	0	0	10	0	1	11	5	2	2	0	32
6:15-6:30a	4	5	1	0	16	0	4	19	17	0	2	0	68
6:30-6:45a	8	1	0	3	23	0	2	23	18	6	1	1	86
6:45-7:00a	13	4	2	1	33	0	5	39	18	3	1	1	120
7:00-7:15a	12	7	1	1	25	1	7	23	25	10	3	1	116
7:15-7:30a	17	12	0	0	30	6	1	21	22	13	1	1	124
7:30-7:45a	12	11	4	1	30	0	9	19	20	14	4	1	125
7:45-8:00a	9	7	6	2	19	1	9	20	30	11	3	0	117
8:00-8:15a	15	8	0	1	30	1	3	28	28	11	4	1	130
8:15-8:30a	4	1	0	0	8	1	4	26	20	13	6	0	83
6:30-8:30a	94	57	14	9	224	10	45	229	203	83	27	6	1001
7:15-8:15a	53	38	10	4	109	8	22	88	100	49	12	3	496
PHF				0.84			0.89						

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
2:00-2:15p	22	14	2	1	27	1	10	15	21	24	7	1	145
2:15-2:30p	4	6	0	2	30	2	10	17	19	27	7	1	125
2:30-2:45p	13	7	1	0	25	3	10	19	33	30	4	1	146
2:45-3:00p	8	5	1	1	17	2	6	24	35	35	7	2	143
3:00-3:15p	10	5	5	2	33	0	8	21	17	37	7	3	148
3:15-3:30p	7	6	1	1	23	1	11	20	28	38	13	3	152
3:30-3:45p	12	6	1	3	41	0	17	18	24	33	13	5	173
3:45-4:00p	13	12	1	1	35	4	13	15	17	44	9	3	167
4:00-4:15p	7	2	1	3	39	3	13	23	28	38	11	4	172
4:15-4:30p	9	6	1	3	20	1	8	17	22	36	9	1	133
4:30-4:45p	17	9	4	0	41	2	10	26	14	34	8	1	166
4:45-5:00p	7	8	1	1	28	3	14	22	27	53	9	3	176
5:00-5:15p	14	8	1	1	35	2	10	16	23	37	12	5	164
5:15-5:30p	4	5	2	2	19	4	12	19	18	40	5	0	130
2:00-5:30p	147	99	22	21	413	28	152	272	326	506	121	33	2140
3:15-4:15p	39	26	4	8	138	8	54	76	97	153	46	15	664
PHF				0.86			0.89						

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

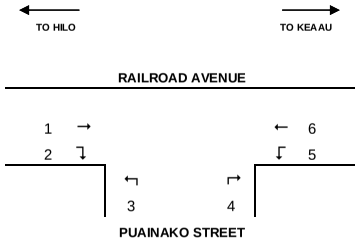
LOCATION: Puainako Street / Ohuohu Street
DATE: Saturday, October 11, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Clear
RECORDER: Carole Darby



TIME PERIOD	MOVEMENT NUMBER												TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	
9:00-9:15a	6	8	2	0	28	5	10	25	53	26	5	0	168
9:15-9:30a	14	7	0	1	38	1	4	36	52	27	7	1	188
9:30-9:45a	11	11	0	0	30	0	2	30	48	19	4	0	155
9:45-10:00a	14	2	3	4	29	2	5	15	29	11	2	0	116
10:00-10:15a	14	10	2	1	37	0	5	25	34	21	8	0	157
10:15-10:30a	13	10	4	1	27	3	11	29	41	31	7	4	181
10:30-10:45a	9	7	1	3	31	2	9	24	32	30	1	2	151
10:45-11:00a	12	6	2	2	33	3	4	19	30	25	3	0	139
11:00-11:15a	9	7	1	1	34	2	9	21	42	26	5	2	156
11:15-11:30a	5	7	0	0	35	1	13	23	53	27	6	3	173
11:30-11:45a	8	12	2	0	34	6	9	23	38	35	2	3	172
11:45-12:00n	10	4	1	0	42	1	8	17	36	35	0	6	160
12:00-12:15p	8	8	2	1	45	2	8	21	47	47	13	2	204
12:15-12:30p	14	5	3	1	33	4	11	28	41	42	9	2	193
12:30-12:45p	6	8	2	1	22	2	7	29	26	43	4	4	154
12:45-1:00p	6	6	4	2	33	1	8	8	32	36	3	2	141
9:00a-1:00p	158.5	117.5	29	18	531	35	122.5	373	633.5	481	78.5	30.5	2608
11:30a-12:30p	40	29	8	2	154	13	36	89	162	159	24	13	729
PHF				0.88			0.90			0.79			

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Puainako Street / Railroad Avenue
DATE: Thursday, September 25, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Light Rain
RECORDER: Kitty Santos

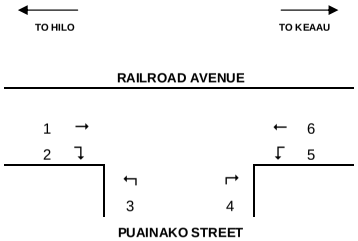


TIME PERIOD	MOVEMENT NUMBER						TOTAL
	1	2	3	4	5	6	
6:00-6:15a	8	8	13	1	5	23	58
6:15-6:30a	9	11	19	2	9	33	83
6:30-6:45a	16	13	23	4	11	45	112
6:45-7:00a	17	19	37	4	21	79	177
7:00-7:15a	28	11	18	7	15	111	190
7:15-7:30a	32	17	22	5	22	127	225
7:30-7:45a	38	15	17	3	15	133	221
7:45-8:00a	46	21	23	10	11	100	211
8:00-8:15a	31	19	18	1	5	35	109
8:15-8:30a	43	28	23	7	6	42	149
6:00-8:30a	268	162	213	44	120	728	1535
7:00-8:00a	144	64	80	25	63	471	847
PHF	0.78		0.80		0.90		

TIME PERIOD	MOVEMENT NUMBER						TOTAL
	1	2	3	4	5	6	
2:00-2:15p	51	23	15	6	7	40	142
2:15-2:30p	57	28	17	5	5	40	152
2:30-2:45p	69	26	11	10	9	33	158
2:45-3:00p	61	20	21	6	7	54	169
3:00-3:15p	81	36	19	12	11	35	194
3:15-3:30p	76	22	14	14	9	46	181
3:30-3:45p	92	40	15	7	8	52	214
3:45-4:00p	74	32	13	10	4	50	183
4:00-4:15p	93	53	18	11	7	39	221
4:15-4:30p	83	27	9	10	8	32	169
4:30-4:45p	104	33	17	11	12	34	211
4:45-5:00p	84	29	14	12	8	33	180
5:00-5:15p	91	34	3	18	5	25	176
5:15-5:30p	65	14	10	19	6	35	149
2:00-5:30p	1081	417	196	151	106	548	2499
3:15-4:15p	335	147	60	42	28	187	799
PHF	0.91		0.88		0.90		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

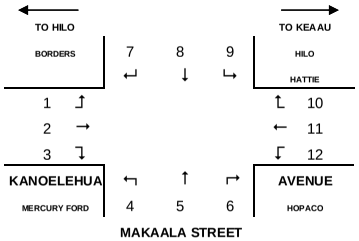
LOCATION: Puainako Street / Railroad Avenue
DATE: Saturday, October 11, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Sunny
RECORDER: Kitty Santos



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
9:00-9:15a	36	32	13	5	12	38	136
9:15-9:30a	40	24	16	9	7	39	135
9:30-9:45a	25	13	14	7	12	43	114
9:45-10:00a	47	29	20	5	9	50	160
10:00-10:15a	50	23	27	12	9	58	179
10:15-10:30a	48	20	20	12	16	47	163
10:30-10:45a	41	28	16	7	4	56	152
10:45-11:00a	51	39	26	3	11	57	187
11:00-11:15a	55	36	21	6	14	53	184
11:15-11:30a	59	33	15	9	16	49	181
11:30-11:45a	34	22	14	12	10	34	126
11:45-12:00n	41	37	17	11	14	53	173
12:00-12:15p	60	39	19	11	5	37	171
12:15-12:30p	40	23	17	6	2	37	125
12:30-12:45p	41	22	18	16	7	37	141
12:45-1:00p	53	29	18	9	10	38	157
9:00a-1:00p	721	449	291	140	158	726	2484
10:30a-11:30a	206	136	78	25	45	215	681
PHF	0.93				0.98		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Makaala Street / Kanoelehua Avenue
DATE: Wednesday, September 24, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby

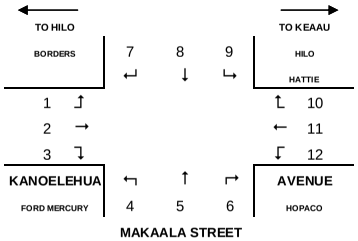


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:00-6:15a	14	56	3	0	6	4	5	8	11	38	110	15	270
6:15-6:30a	10	61	1	2	7	10	14	12	23	39	195	20	394
6:30-6:45a	13	84	0	2	7	12	23	8	9	37	215	34	444
6:45-7:00a	38	104	2	1	20	14	39	23	23	58	220	34	576
7:00-7:15a	30	108	0	4	12	27	56	14	21	56	320	60	708
7:15-7:30a	32	135	4	6	18	16	50	16	26	42	333	51	729
7:30-7:45a	44	130	4	2	24	22	66	24	32	43	294	43	728
7:45-8:00a	33	84	3	2	14	20	62	33	28	48	351	85	763
8:00-8:15a	49	135	6	5	19	36	43	21	31	49	259	66	719
8:15-8:30a	37	85	4	3	25	9	54	24	37	67	217	43	605
6:30-8:30a	300	982	27	27	152	170	412	183	241	477	2514	451	5936
7:00-8:00a	139	457	11	14	68	85	234	87	107	189	1298	239	2928
PHF	0.85			0.87			0.88			0.89			

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
2:00-2:15p	99	202	6	5	50	38	100	24	76	58	164	28	850
2:15-2:30p	99	185	6	12	55	56	72	32	91	75	187	22	892
2:30-2:45p	112	203	2	7	33	41	99	33	89	49	149	16	833
2:45-3:00p	99	202	4	9	29	27	86	33	104	73	176	27	869
3:00-3:15p	88	237	2	8	42	50	87	23	105	51	156	20	869
3:15-3:30p	85	184	5	9	46	49	94	22	106	51	171	20	842
3:30-3:45p	56	220	1	10	45	45	75	18	107	49	169	25	820
3:45-4:00p	87	241	1	2	37	48	92	27	108	57	203	18	921
4:00-4:15p	102	291	8	5	46	79	57	27	100	64	181	18	978
4:15-4:30p	80	250	8	7	43	52	82	21	103	62	186	19	913
4:30-4:45p	108	320	7	5	74	83	90	18	116	54	156	21	1052
4:45-5:00p	79	272	4	3	46	61	75	22	93	79	173	25	932
5:00-5:15p	93	284	1	3	32	64	76	27	120	64	121	10	895
5:15-5:30p	65	208	3	2	28	38	76	16	109	71	147	11	774
2:00-5:30p	1252	3299	58	87	606	731	1161	343	1427	857	2339	280	12440
4:00-5:00p	369	1133	27	20	209	275	304	88	412	259	696	83	3875
PHF	0.88			0.78			0.90			0.94			

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

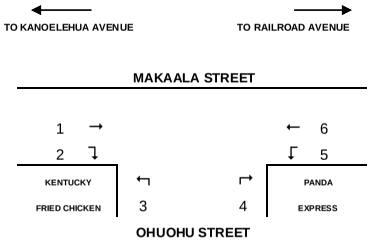
LOCATION: Makaala Street / Kanoelehua Avenue
DATE: Saturday, October 4, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER:
RECORDER: Carole Darby



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
9:00-9:15a	54	144	14	2	34	22	36	15	58	66	190	24	659
9:15-9:30a	74	143	13	1	29	29	44	16	54	70	186	53	712
9:30-9:45a	85	138	6	2	32	32	70	22	64	87	184	20	742
9:45-10:00a	83	155	6	6	32	25	62	15	59	65	188	30	726
10:00-10:15a	100	121	2	5	42	30	73	29	83	82	187	19	773
10:15-10:30a	97	167	10	6	38	39	73	16	64	78	193	16	797
10:30-10:45a	96	156	7	6	28	49	93	20	87	45	180	24	791
10:45-11:00a	102	148	9	1	25	35	60	30	85	58	179	31	763
11:00-11:15a	105	174	8	2	28	42	76	27	92	54	198	27	829
11:15-11:30a	107	199	6	2	31	48	92	23	99	50	216	22	895
11:30-11:45a	76	153	10	8	38	34	74	18	85	59	132	21	708
11:45-12:00n	113	177	7	5	31	36	84	17	107	87	205	28	897
12:00-12:15p	123	193	9	5	46	44	100	23	103	86	219	16	967
12:15-12:30p	116	175	6	1	53	44	77	17	93	114	198	33	927
12:30-12:45p	101	169	5	2	28	32	84	22	90	47	156	20	756
12:45-1:00p	88	193	4	3	37	30	87	26	96	102	162	37	865
9:00a-1:00p	1520	2605	122	57	552	571	1185	336	1319	1150	2973	421	12807
11:45n-12:45p	453	714	27	13	158	156	345	79	393	334	778	97	3547
PHF	0.92			0.83			0.90			0.94			

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Makaala Street / Ohuohu Street
DATE: Tuesday, September 23, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Partly Cloudy
RECORDER: Kitty Santos

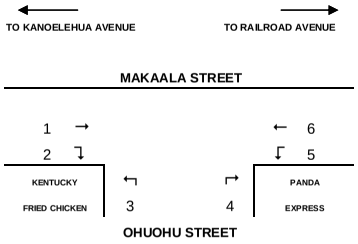


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
6:00-6:15a	19	3	2	4	0	20	48
6:15-6:30a	12	4	9	4	0	13	42
6:30-6:45a	14	2	11	5	3	15	50
6:45-7:00a	24	4	21	11	3	36	99
7:00-7:15a	30	13	31	4	3	45	126
7:15-7:30a	23	9	14	6	4	32	88
7:30-7:45a	21	21	20	8	5	36	111
7:45-8:00a	30	18	26	12	7	46	139
8:00-8:15a	36	24	26	13	4	36	139
8:15-8:30a	28	16	22	15	7	38	126
6:00-8:30a	237	114	182	82	36	317	968
7:30-8:30a	115	79	94	48	23	156	515
PHF	0.81		0.91		0.84		

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
2:00-2:15p	49	53	44	12	14	76	248
2:15-2:30p	39	41	34	11	7	53	185
2:30-2:45p	38	35	41	16	14	58	202
2:45-3:00p	51	28	42	12	8	51	192
3:00-3:15p	46	35	55	17	14	74	241
3:15-3:30p	40	35	39	18	9	56	197
3:30-3:45p	49	38	37	8	11	57	200
3:45-4:00p	58	39	35	12	19	45	208
4:00-4:15p	55	43	33	16	12	71	230
4:15-4:30p	38	31	30	9	8	50	166
4:30-4:45p	38	41	31	16	6	48	180
4:45-5:00p	37	46	36	14	14	46	193
5:00-5:15p	33	50	43	10	13	41	190
5:15-5:30p	34	51	39	12	9	44	189
2:00-5:30p	605	566	539	183	158	770	2821
3:15-4:15p	202	155	144	54	51	229	835
PHF	0.91		0.87		0.84		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

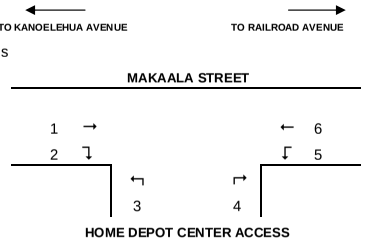
LOCATION: Makaala Street / Ohuohu Street
DATE: Saturday, September 27, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Mostly Sunny
RECORDER: Kitty Santos



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
9:00-9:15a	36	24	44	19	14	36	173
9:15-9:30a	34	22	45	12	12	45	170
9:30-9:45a	45	38	35	20	14	41	193
9:45-10:00a	45	40	42	31	16	58	232
10:00-10:15a	47	28	30	16	14	51	186
10:15-10:30a	55	33	50	18	22	67	245
10:30-10:45a	43	51	45	21	15	71	246
10:45-11:00a	46	44	50	20	7	62	229
11:00-11:15a	54	41	47	23	8	60	233
11:15-11:30a	62	38	44	26	9	57	236
11:30-11:45a	23	32	38	18	16	47	174
11:45-12:00n	80	62	64	24	21	74	325
12:00-12:15p	60	41	80	19	18	64	282
12:15-12:30p	61	48	52	27	20	74	282
12:30-12:45p	51	29	32	17	20	50	199
12:45-1:00p	45	38	44	18	14	62	221
9:00a-1:00p	787	609	742	329	240	918.5	3626
12:00n-1:00p	217	156	208	81	72	250	984
PHF	0.86		0.91		0.86		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Makaala Street / Home Depot Middle Access
DATE: Thursday, October 23, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Clear
RECORDER: Carole Darby

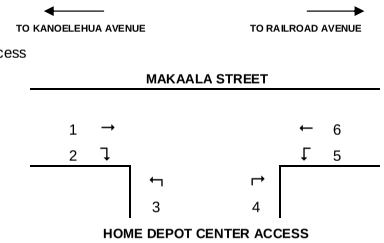


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
6:00-6:15a	11	10	11	0	0	6	38
6:15-6:30a	12	7	9	0	1	7	36
6:30-6:45a	12	10	3	1	0	11	37
6:45-7:00a	19	9	6	2	0	18	54
7:00-7:15a	15	15	6	0	0	15	51
7:15-7:30a	22	11	8	2	2	39	84
7:30-7:45a	19	15	7	1	0	38	80
7:45-8:00a	16	15	13	2	2	43	91
8:00-8:15a	23	14	12	0	2	38	89
8:15-8:30a	25	16	12	2	2	23	80
6:00-8:30a	174	122	87	10	9	238	640
7:30-8:30a	83	60	44	5	6	142	340
PHF	0.87				0.82		

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
2:00-2:15p	33	25	14	6	0	46	124
2:15-2:30p	29	14	14	0	0	51	108
2:30-2:45p	35	22	16	2	2	37	114
2:45-3:00p	28	29	23	5	0	41	126
3:00-3:15p	20	22	25	5	3	39	114
3:15-3:30p	35	25	14	3	2	39	118
3:30-3:45p	43	14	23	2	0	52	134
3:45-4:00p	39	25	6	1	1	42	114
4:00-4:15p	40	25	25	2	2	39	133
4:15-4:30p	35	21	17	2	4	34	113
4:30-4:45p	30	13	11	3	0	39	96
4:45-5:00p	40	22	13	1	0	51	127
5:00-5:15p	29	20	22	3	0	48	122
5:15-5:30p	26	15	12	1	0	36	90
2:00-5:30p	462	292	235	36	14	594	1633
3:30-4:30p	157	85	71	7	7	167	494
PHF	0.93				0.84		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

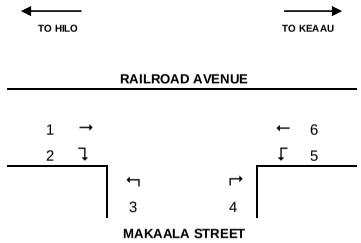
LOCATION: Makaala Street / Home Depot Middle Access
DATE: Saturday, October 25, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Cloudy
RECORDER: Carole Darby



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
9:00-9:15a	19	22	16	1	1	43	102
9:15-9:30a	18	35	11	1	0	39	104
9:30-9:45a	23	29	22	1	0	48	123
9:45-10:00a	31	36	16	4	1	36	124
10:00-10:15a	20	25	23	4	1	50	123
10:15-10:30a	32	41	9	6	2	54	144
10:30-10:45a	30	21	20	2	0	54	127
10:45-11:00a	23	53	12	2	1	59	150
11:00-11:15a	41	52	29	3	0	50	175
11:15-11:30a	41	31	26	4	0	76	178
11:30-11:45a	39	36	27	3	0	42	147
11:45-12:00n	41	31	24	6	1	55	158
12:00-12:15p	36	39	33	0	0	54	162
12:15-12:30p	48	41	24	2	2	62	179
12:30-12:45p	31	43	33	1	3	43	154
12:45-1:00p	40	48	25	0	2	50	165
9:00a-1:00p	513	583	350	40	14	815	2315
12:00n-1:00p	155	171	115	3	7	209	660
PHF	0.92				0.84		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Makaala Street / Railroad Avenue
DATE: Wednesday, September 24, 2008
TIME: 6:00a-8:30a / 2:00p-5:30p
WEATHER: Light Rain
RECORDER: Kitty Santos

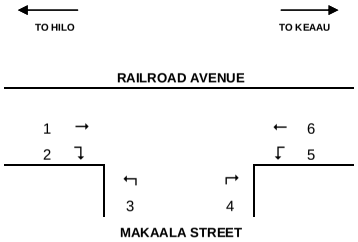


TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
6:00-6:15a	17	5	4	4	5	38	73
6:15-6:30a	17	3	8	2	9	33	72
6:30-6:45a	21	5	10	2	8	62	108
6:45-7:00a	24	11	13	5	12	88	153
7:00-7:15a	29	12	14	5	23	79	162
7:15-7:30a	38	14	15	5	14	117	203
7:30-7:45a	38	12	8	7	26	101	192
7:45-8:00a	60	22	12	5	27	119	245
8:00-8:15a	62	28	14	10	10	60	184
8:15-8:30a	50	28	22	12	8	42	162
6:00-8:30a	356	140	120	57	142	739	1554
7:15-8:15a	198	76	49	27	77	397	824
PHF	0.76				0.81		

TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
2:00-2:15p	47	26	29	16	8	34	160
2:15-2:30p	66	31	22	18	7	48	192
2:30-2:45p	86	28	21	11	11	50	207
2:45-3:00p	72	28	17	16	8	46	187
3:00-3:15p	88	33	22	14	7	49	213
3:15-3:30p	78	31	25	10	15	45	204
3:30-3:45p	129	44	12	17	13	48	263
3:45-4:00p	79	28	15	16	11	52	201
4:00-4:15p	104	43	15	14	14	39	229
4:15-4:30p	100	31	18	23	9	38	219
4:30-4:45p	124	31	22	16	6	48	247
4:45-5:00p	91	35	14	20	7	22	189
5:00-5:15p	96	36	13	26	15	40	226
5:15-5:30p	66	19	11	22	12	16	146
2:00-5:30p	1226	444	256	239	143	575	2883
3:15-4:15p	390	146	67	57	53	184	897
PHF	0.91				0.97		

TRAFFIC TURNING MOVEMENT COUNT
G70 EAST MAKAALA STREET PROJECT

LOCATION: Makaala Street / Railroad Avenue
DATE: Saturday, October 4, 2008
TIME: 9:00 a.m. - 1:00 p.m.
WEATHER: Overcast; Rain
RECORDER:



TIME PERIOD	MOVEMENT NUMBER 1	2	3	4	5	6	TOTAL
9:00-9:15a	63	25	12	16	10	45	171
9:15-9:30a	37	25	13	7	10	50	142
9:30-9:45a	43	21	9	10	8	48	139
9:45-10:00a	37	23	21	14	11	43	149
10:00-10:15a	42	29	21	11	5	24	132
10:15-10:30a	46	33	22	15	12	42	170
10:30-10:45a	44	42	24	8	12	39	169
10:45-11:00a	51	39	24	16	18	53	201
11:00-11:15a	54	45	30	19	16	60	223
11:15-11:30a	56	50	36	22	14	67	245
11:30-11:45a	39	32	25	14	14	51	175
11:45-12:00n	55	34	31	16	16	40	192
12:00-12:15p	62	44	36	17	8	31	198
12:15-12:30p	45	34	23	17	10	46	175
12:30-12:45p	64	31	25	26	19	49	214
12:45-1:00p	55	43	22	16	9	33	178
9:00a-1:00p	793	550	374	244	192	721	2873
11:00a-12:00p	204	161	122	71	60	218	835
PHF	0.86		0.83		0.86		

Appendix B

Signalized Intersection Level of Service (LOS) Calculations

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMEX21LT 2008
Comment: EXIST AM PK W/2 LT

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	316	194	102	104	173	42	446	1347	128	35	483	99
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	29	9	8.7	11		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 100 Lost time per cycle (s): 11 Critical v/c Ratio: .66

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	343	211	2	113	188	2	485	1464	85	38	525	0
Capacity (veh/h)	643	441	372	309	390	174	687	1561	928	142	1471	694
Adjusted saturation flow (veh/h)	3437	1863	1571	3437	3547	1583	3437	3547	1565	1770	5074	1567
v/c ratio	.534	.478	.006	.365	.482	.012	.705	.938	.091	.269	.357	0
g/C ratio	.187	.237	.237	.09	.11	.11	.2	.44	.593	.08	.29	.443
Average back of queue (veh)	4.9	5.4	0	1.7	2.8	.1	7.1	25	.6	1.1	4.5	0
Uniform delay (s)	36.7	32.8	29.1	42.8	41.8	39.7	37.3	26.7	8.8	43.2	28.1	15.5
Incremental delay (s)	.9	.7	0	0	.8	0	3.3	11.3	0	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	37.6	33.5	29.1	42.8	42.6	39.7	40.6	34	5.2	43.2	28.1	15.5
LOS	D	C	C	D	D	D	D	C	A	D	C	B
Approach delay (s)/LOS	36 / D			42.7 / D			34.3 / C			29.1 / C		
Intersection delay (s)/ LOS	34.5 / C											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM AMB 2013
Comment: 2013 AMBIENT AM PEAK HOUR

Site Information

Jurisdiction/Date: 10/30/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	332	204	107	109	182	44	468	1414	134	37	507	104
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	30	12.7	9	11		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 105 Lost time per cycle (s): 11 Critical v/c Ratio: .8

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	361	222	8	118	198	4	509	1537	91	40	551	5
Capacity (veh/h)	383	426	359	214	372	166	655	1520	954	135	1450	731
Adjusted saturation flow (veh/h)	1770	1863	1570	1770	3547	1583	3437	3547	1565	1770	5074	1567
v/c ratio	.943	.521	.021	.554	.532	.026	.777	1.011	.096	.298	.38	.007
g/C ratio	.216	.229	.229	.121	.105	.105	.19	.429	.61	.076	.286	.467
Average back of queue (veh)	13.6	6.1	.2	3.6	3.2	.1	8.3	32.4	.6	1.2	5	.1
Uniform delay (s)	40.5	35.5	31.4	43.5	44.6	42.2	40.4	30	8.5	45.8	30	15
Incremental delay (s)	31.8	1.2	0	3.1	1.5	0	5.9	25.9	0	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	72.3	36.7	31.4	46.6	46.1	42.2	46.3	51.8	4.7	45.8	30	15
LOS	E	D	C	D	D	D	D	D	A	D	C	B
Approach delay (s)/LOS	58.4 / E			46.2 / D			48.5 / D			31 / C		
Intersection delay (s)/ LOS	47 / D											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMEX 2008
Comment: 2008 EXISTING AM PEAK HOUR

Site Information

Jurisdiction/Date: 10/30/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	316	194	102	104	173	42	446	1347	128	35	483	99
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	29	9	8.7	11		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 100 Lost time per cycle (s): 11 Critical v/c Ratio: .766

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	343	211	2	113	188	2	485	1464	85	38	525	0
Capacity (veh/h)	331	441	372	159	390	174	687	1561	928	142	1471	694
Adjusted saturation flow (veh/h)	1770	1863	1571	1770	3547	1583	3437	3547	1565	1770	5074	1567
v/c ratio	1.038	.478	.006	.71	.482	.012	.705	.938	.091	.269	.357	0
g/C ratio	.187	.237	.237	.09	.11	.11	.2	.44	.593	.08	.29	.443
Average back of queue (veh)	14.4	5.4	0	3.6	2.8	.1	7.1	25	.6	1.1	4.5	0
Uniform delay (s)	40.7	32.8	29.1	44.2	41.8	39.7	37.3	26.7	8.8	43.2	28.1	15.5
Incremental delay (s)	59.7	.7	0	13.7	.8	0	3.3	11.3	0	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	100.4	33.5	29.1	57.9	42.6	39.7	40.6	34	5.2	43.2	28.1	15.5
LOS	F	C	C	E	D	D	D	C	A	D	C	B
Approach delay (s)/LOS	74.8 / E			48.3 / D			34.3 / C			29.1 / C		
Intersection delay (s)/ LOS	41.2 / D											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMEX3NB 2008
Comment: EXIST AM PK W/3 NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	316	194	102	104	173	42	446	1347	128	35	483	99
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT F: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	25	13	8.7	11		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 100 Lost time per cycle (s): 11 Critical v/c Ratio: .626

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	TR		L	T	R
No. of lanes	1	1	1	1	2	1	2	3		1	3	1
Flow rate (veh/h)	343	211	2	113	188	2	485	1464		38	525	0
Capacity (veh/h)	402	441	372	230	390	174	687	2030		142	1269	694
Adjusted saturation flow (veh/h)	1770	1863	1571	1770	3547	1583	3437	5074		1770	5074	1566
v/c ratio	.855	.478	.006	.491	.482	.012	.705	.721		.269	.414	0
g/C ratio	.227	.237	.237	.13	.11	.11	.2	.4		.08	.25	.443
Average back of queue (veh)	11.1	5.4	0	3.2	2.8	.1	7.1	12.8		1.1	4.8	0
Uniform delay (s)	37.1	32.8	29.1	40.4	41.8	39.7	37.3	25.3		43.2	31.4	15.5
Incremental delay (s)	16.4	.7	0	1.6	.8	0	3.3	1.3		0	.1	0
Initial queue delay (s)	0	0	0	0	0	0	0	0		0	0	0
Delay (s)	53.5	33.5	29.1	42	42.6	39.7	40.6	23.9		43.2	31.5	15.5
LOS	D	C	C	D	D	D	D	C		D	C	B
Approach delay (s)/LOS	45.8 / D			42.4 / D			28.1 / C			32.3 / C		
Intersection delay (s)/ LOS	33 / C											

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM TOT2LT 2013
Comment: 2013 TOT AM PK W/2LT

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	344	216	107	120	200	44	468	1423	154	37	515	104
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	30	13.7	9	10		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 105 Lost time per cycle (s): 11 Critical v/c Ratio: .703

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	374	235	8	130	217	4	509	1547	113	40	560	5
Capacity (veh/h)	776	408	344	448	338	151	655	1520	969	135	1450	746
Adjusted saturation flow (veh/h)	3437	1863	1570	3437	3547	1583	3437	3547	1565	1770	5074	1567
v/c ratio	.482	.575	.022	.291	.644	.029	.777	1.018	.117	.298	.386	.007
g/C ratio	.226	.219	.219	.13	.095	.095	.19	.429	.619	.076	.286	.476
Average back of queue (veh)	5.3	6.7	.2	1.9	3.7	.1	8.3	33.1	.7	1.2	5.1	.1
Uniform delay (s)	35.3	36.6	32.2	41.3	45.8	43.1	40.4	30	8.2	45.8	30.1	14.5
Incremental delay (s)	.4	2	0	0	4.2	0	5.9	27.6	0	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	35.7	38.6	32.2	41.3	50	43.1	46.3	53.5	4.3	45.8	30.1	14.5
LOS	D	D	C	D	D	D	D	D	A	D	C	B
Approach delay (s)/LOS	36.8	/	D	46.7	/	D	49.2	/	D	31	/	C
Intersection delay (s)/ LOS	44			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMTO3N2L 2013
Comment: 2013 TOT AM PK W/3NB 2LT LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	344	216	107	120	200	44	468	1423	154	37	515	104
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	25	18.7	9	10		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 105 Lost time per cycle (s): 11 Critical v/c Ratio: .556

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	3	1	1	3	1
Flow rate (veh/h)	374	235	8	130	217	4	509	1547	113	40	560	5
Capacity (veh/h)	939	777	344	612	338	151	655	1933	972	135	1208	745
Adjusted saturation flow (veh/h)	3437	3547	1570	3437	3547	1583	3437	5074	1571	1770	5074	1566
v/c ratio	.398	.302	.022	.213	.644	.029	.777	.8	.116	.298	.463	.007
g/C ratio	.273	.219	.219	.178	.095	.095	.19	.381	.619	.076	.238	.476
Average back of queue (veh)	4.9	3.2	.2	1.8	3.7	.1	8.3	15.9	.7	1.2	5.5	.1
Uniform delay (s)	31.1	34.3	32.2	36.9	45.8	43.1	40.4	28.9	8.2	45.8	34.3	14.5
Incremental delay (s)	.1	0	0	0	4.2	0	5.9	2.5	0	0	.2	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	31.2	34.3	32.2	36.9	50	43.1	46.3	29	4.3	45.8	34.5	14.5
LOS	C	C	C	D	D	D	D	C	A	D	C	B
Approach delay (s)/LOS	32.4	/	C	45	/	D	31.7	/	C	35	/	C
Intersection delay (s)/ LOS	33.6			/			C					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM TOT 2013
Comment: 2013 TOTAL AM PEAK HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	344	216	107	120	200	44	468	1423	154	37	515	104
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	4	4	4	3	3	3
Arrival type, AT	3	3	3	3	3	3						
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	30	13.7	9	10		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 105 Lost time per cycle (s): 11 Critical v/c Ratio: .817

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	374	235	8	130	217	4	509	1547	113	40	560	5
Capacity (veh/h)	399	408	344	231	338	151	655	1520	969	135	1450	746
Adjusted saturation flow (veh/h)	1770	1863	1570	1770	3547	1583	3437	3547	1565	1770	5074	1567
v/c ratio	.936	.575	.022	.565	.644	.029	.777	1.018	.117	.298	.386	.007
g/C ratio	.226	.219	.219	.13	.095	.095	.19	.429	.619	.076	.286	.476
Average back of queue (veh)	13.9	6.7	.2	4	3.7	.1	8.3	33.1	.7	1.2	5.1	.1
Uniform delay (s)	39.9	36.6	32.2	42.9	45.8	43.1	40.4	30	8.2	45.8	30.1	14.5
Incremental delay (s)	29.4	2	0	3.2	4.2	0	5.9	27.6	0	0	0	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	69.3	38.6	32.2	46.1	50	43.1	46.3	53.5	4.3	45.8	30.1	14.5
LOS	E	D	C	D	D	D	D	D	A	D	C	B
Approach delay (s)/LOS	57.2	/	E	48.4	/	D	49.2	/	D	31	/	C
Intersection delay (s)/ LOS	47.5			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMTO3NB 2013
Comment: 2013 TOT AM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	344	216	107	120	200	44	468	1423	154	37	515	104
RTOR volume (veh/h)			100			40			50			99
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	LTR	TR		
WB				L		TR		
NB	L	LTR	TR	R				
SB	L		TR	R				
Green (s)	8	11	25	18.7	9	10		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 105 Lost time per cycle (s): 11 Critical v/c Ratio: .67

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	3	1	1	3	1
Flow rate (veh/h)	374	235	8	130	217	4	509	1547	113	40	560	5
Capacity (veh/h)	484	408	344	315	338	151	655	1933	967	135	1208	745
Adjusted saturation flow (veh/h)	1770	1863	1570	1770	3547	1583	3437	5074	1563	1770	5074	1566
v/c ratio	.773	.575	.022	.414	.644	.029	.777	.8	.117	.298	.463	.007
g/C ratio	.273	.219	.219	.178	.095	.095	.19	.381	.619	.076	.238	.476
Average back of queue (veh)	11.6	6.7	.2	3.6	3.7	.1	8.3	15.9	.7	1.2	5.5	.1
Uniform delay (s)	35.1	36.6	32.2	38.3	45.8	43.1	40.4	28.9	8.2	45.8	34.3	14.5
Incremental delay (s)	7.6	2	0	.3	4.2	0	5.9	2.5	0	0	.2	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	42.7	38.6	32.2	38.6	50	43.1	46.3	29	4.3	45.8	34.5	14.5
LOS	D	D	C	D	D	D	D	C	A	D	C	B
Approach delay (s)/LOS	41.1	/	D	45.7	/	D	31.7	/	C	35	/	C
Intersection delay (s)/ LOS	35.1			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMEX2LT 2008
Comment: EXIST PM PK W/2LT

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	246	320	206	308	340	126	220	675	128	158	1207	313
RTOR volume (veh/h)			205			125			50			300
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	11	2	22	10.7	4	23		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 96 | Lost time per cycle (s): 11 | Critical v/c Ratio: .692

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	267	348	1	335	370	1	239	734	85	172	1312	14
Capacity (veh/h)	383	446	376	562	1145	511	394	813	633	258	1480	457
Adjusted saturation flow (veh/h)	3437	1863	1571	3437	3547	1583	3437	3547	1557	1770	5074	1567
v/c ratio	.698	.779	.003	.596	.323	.002	.607	.903	.134	.665	.886	.031
g/C ratio	.111	.24	.24	.164	.323	.323	.115	.229	.406	.146	.292	.292
Average back of queue (veh)	4.1	10.1	0	4.7	4.2	0	3.5	12.6	1.5	4.8	14.8	.2
Uniform delay (s)	41.1	34.1	27.8	37.2	24.6	22	40.4	36	17.9	38.8	32.5	24.3
Incremental delay (s)	5.5	8.6	0	1.7	0	0	2.7	13.4	0	6.4	6.9	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	46.6	42.7	27.8	38.9	24.6	22	43.1	49.4	17.9	45.2	39.1	24.1
LOS	D	D	C	D	C	C	D	D	B	D	D	C
Approach delay (s)/LOS	44.4	/	D	31.4	/	C	45.4	/	D	39.7	/	D
Intersection delay (s)/ LOS	40.5			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM AMB 2013
Comment: 2013 AMBIENT PM PEAK HOUR

Site Information

Jurisdiction/Date: 10/30/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	258	336	216	323	357	132	231	709	134	166	1267	328
RTOR volume (veh/h)			205			125			50			300
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	13	4	27.5	20.5	3	24		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 115.3 | Lost time per cycle (s): 11 | Critical v/c Ratio: .817

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	280	365	12	351	388	8	251	771	91	180	1377	30
Capacity (veh/h)	315	388	327	376	954	426	387	846	731	276	1562	483
Adjusted saturation flow (veh/h)	1770	1863	1569	1770	3547	1583	3437	3547	1552	1770	5074	1568
v/c ratio	.891	.942	.037	.934	.407	.018	.648	.911	.125	.653	.882	.063
g/C ratio	.178	.208	.208	.212	.269	.269	.113	.239	.471	.156	.308	.308
Average back of queue (veh)	10.9	14.9	.3	14.2	5.7	.2	4.5	15.7	1.7	6	18.1	.6
Uniform delay (s)	46.3	45	36.4	44.6	34.6	31	49	42.7	17.1	45.7	37.9	28.2
Incremental delay (s)	25.6	31.2	0	30.1	.1	0	3.8	13.9	0	5.4	6.3	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	71.9	76.2	36.4	74.7	34.7	31	52.8	56.6	17.1	51.1	43.4	27.6
LOS	E	E	D	E	C	C	D	E	B	D	D	C
Approach delay (s)/LOS	73.6	/	E	53.5	/	D	52.5	/	D	44	/	D
Intersection delay (s)/ LOS	52.8			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM EX 2008
Comment: 2008 EXISTING PM PEAK HOUR

Site Information

Jurisdiction/Date: 10/31/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	246	320	206	308	340	126	220	675	128	158	1207	313
RTOR volume (veh/h)			205			125			50			300
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	11	2	22	14.7	4	19		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 96 | Lost time per cycle (s): 11 | Critical v/c Ratio: .795

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	267	348	1	335	370	1	239	734	85	172	1312	14
Capacity (veh/h)	271	369	311	363	998	445	394	813	697	258	1480	457
Adjusted saturation flow (veh/h)	1770	1863	1571	1770	3547	1583	3437	3547	1557	1770	5074	1567
v/c ratio	.987	.943	.003	.922	.37	.002	.607	.903	.122	.665	.886	.031
g/C ratio	.153	.198	.198	.205	.281	.281	.115	.229	.448	.146	.292	.292
Average back of queue (veh)	10.2	12.2	0	11.4	4.4	0	3.5	12.6	1.4	4.8	14.8	.2
Uniform delay (s)	40.6	38	30.9	37.4	27.7	24.8	40.4	36	15.5	38.8	32.5	24.3
Incremental delay (s)	50.9	32.6	0	28.4	0	0	2.7	13.4	0	6.4	6.9	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	91.5	70.6	30.9	65.8	27.7	24.8	43.1	49.4	15.5	45.2	39.1	24.1
LOS	F	E	C	E	C	C	D	D	B	D	D	C
Approach delay (s)/LOS	79.6	/	E	45.8	/	D	45.2	/	D	39.7	/	D
Intersection delay (s)/ LOS	48.6			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM EX3NB 2008
Comment: EXIST PM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	246	320	206	308	340	126	220	675	128	158	1207	313
RTOR volume (veh/h)			205			125			50			300
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	11	2	22	14.7	4	19		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 96 | Lost time per cycle (s): 11 | Critical v/c Ratio: .795

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	TR		L	T	R
No. of lanes	1	1	1	1	2	1	2	3		1	3	1
Flow rate (veh/h)	267	348	1	335	370	1	239	734		172	1312	14
Capacity (veh/h)	271	369	311	363	998	445	394	1163		258	1480	457
Adjusted saturation flow (veh/h)	1770	1863	1571	1770	3547	1583	3437	5074		1770	5074	1567
v/c ratio	.987	.943	.003	.922	.37	.002	.607	.631		.665	.886	.031
g/C ratio	.153	.198	.198	.205	.281	.281	.115	.229		.146	.292	.292
Average back of queue (veh)	10.2	12.2	0	11.4	4.4	0	3.5	7.2		4.8	14.8	.2
Uniform delay (s)	40.6	38	30.9	37.4	27.7	24.8	40.4	33.3		38.8	32.5	24.3
Incremental delay (s)	50.9	32.6	0	28.4	0	0	2.7	1.1		6.4	6.9	0
Initial queue delay (s)	0	0	0	0	0	0	0	0		0	0	0
Delay (s)	91.5	70.6	30.9	65.8	27.7	24.8	43.1	34.4		45.2	39.1	24.1
LOS	F	E	C	E	C	C	D	C		D	D	C
Approach delay (s)/LOS	79.6	/	E	45.8	/	D	36.6	/	D	39.7	/	D
Intersection delay (s)/ LOS	46.5			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMTOT2LT 2013
Comment: 2013 TOT PM PK W/2LT

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other — Analysis period: .25 h — Signal type: Actuated-Field — % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	310	390	215	430	425	130	231	750	175	166	1345	370
RTOR volume (veh/h)			205			125			50			400
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR					
SB	L	LTR	TR					
Green (s)	13	5	27	22.7	4	30		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 125 — Lost time per cycle (s): 11 — Critical v/c Ratio: .795

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	337	424	11	467	462	5	251	815	136	180	1462	-33
Capacity (veh/h)	624	447	376	762	1078	481	357	766	335	269	1461	451
Adjusted saturation flow (veh/h)	3437	1863	1568	3437	3547	1583	3437	3547	1549	1770	5074	1567
v/c ratio	.54	.948	.029	.614	.428	.011	.703	1.064	.406	.671	1	-.072
g/C ratio	.182	.24	.24	.222	.304	.304	.104	.216	.216	.152	.288	.288
Average back of queue (veh)	6	18.5	.3	8.3	7.2	.1	5	21.8	4.3	6.5	24.9	-.7
Uniform delay (s)	46.4	46.7	36.4	43.8	34.8	30.4	54.1	49	42.1	50	44.5	31
Incremental delay (s)	1	29.8	0	1.5	.1	0	6.1	50.9	.3	6.4	23.6	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	47.4	76.5	36.4	45.3	34.9	30.4	60.2	99.9	42.4	56.4	67.9	30.9
LOS	D	E	D	D	C	C	E	F	D	E	E	C
Approach delay (s)/LOS	63.3	/	E	40.1	/	D	85.1	/	F	67.3	/	E
Intersection delay (s)/ LOS	65.7			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMTO3N2L 2013
Comment: 2013 TOT PM PK W/3NB 2LT LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other — Analysis period: .25 h — Signal type: Actuated-Field — % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	310	390	215	430	425	130	231	750	175	166	1345	370
RTOR volume (veh/h)			205			125			50			370
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR					
SB	L	LTR	TR					
Green (s)	13	5	27	22.7	4	20		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 115 — Lost time per cycle (s): 11 — Critical v/c Ratio: .682

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	2	1	2	2	1	2	3	1	1	3	1
Flow rate (veh/h)	337	424	11	467	462	5	251	815	136	180	1462	0
Capacity (veh/h)	678	617	273	828	864	386	388	1191	367	292	1588	491
Adjusted saturation flow (veh/h)	3437	3547	1569	3437	3547	1583	3437	5074	1564	1770	5074	1568
v/c ratio	.497	.687	.04	.565	.535	.014	.646	.684	.37	.617	.92	0
g/C ratio	.197	.174	.174	.241	.243	.243	.113	.235	.235	.165	.313	.313
Average back of queue (veh)	5.3	7.5	.3	7.4	7.3	.1	4.5	9.7	3.9	5.8	20.2	0
Uniform delay (s)	41.1	44.6	39.5	38.4	37.8	33	48.8	40.1	36.9	44.6	38.1	27.1
Incremental delay (s)	.6	3.2	0	.9	.7	0	3.7	1.6	0	3.9	9.1	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	41.7	47.8	39.5	39.3	38.5	33	52.5	41.7	36.9	48.5	46.3	26.5
LOS	D	D	D	D	D	C	D	D	D	D	D	C
Approach delay (s)/LOS	45	/	D	38.9	/	D	43.4	/	D	46.5	/	D
Intersection delay (s)/ LOS	43.9			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM TOT 2013
Comment: 2013 TOTAL PM PEAK HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other — Analysis period: .25 h — Signal type: Actuated-Field — % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	310	390	215	430	425	130	231	750	175	166	1345	370
RTOR volume (veh/h)			205			125			50			400
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR					
SB	L	LTR	TR					
Green (s)	13	5	27	22.7	4	30		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 125 — Lost time per cycle (s): 11 — Critical v/c Ratio: .935

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	337	424	11	467	462	5	251	815	136	180	1462	-33
Capacity (veh/h)	321	447	376	392	1078	481	357	766	335	269	1461	451
Adjusted saturation flow (veh/h)	1770	1863	1568	1770	3547	1583	3437	3547	1549	1770	5074	1567
v/c ratio	1.049	.948	.029	1.192	.428	.011	.703	1.064	.406	.671	1	-.072
g/C ratio	.182	.24	.24	.222	.304	.304	.104	.216	.216	.152	.288	.288
Average back of queue (veh)	17	18.5	.3	28	7.2	.1	5	21.8	4.3	6.5	24.9	-.7
Uniform delay (s)	51.2	46.7	36.4	48.7	34.8	30.4	54.1	49	42.1	50	44.5	31
Incremental delay (s)	63.5	29.8	0	108.9	.1	0	6.1	50.9	.3	6.4	23.6	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	114.7	76.5	36.4	157.6	34.9	30.4	60.2	99.9	42.4	56.4	67.9	30.9
LOS	F	E	D	F	C	C	E	F	D	E	E	C
Approach delay (s)/LOS	92.6	/	F	96.2	/	F	85.1	/	F	67.3	/	E
Intersection delay (s)/ LOS	82.4			/			F					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMTO3NB 2013
Comment: 2013 TOT PM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other — Analysis period: .25 h — Signal type: Actuated-Field — % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	310	390	215	430	425	130	231	750	175	166	1345	370
RTOR volume (veh/h)			205			125			50			370
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR					
SB	L	LTR	TR					
Green (s)	13	5	27	22.7	4	30		
Yellow + All red (s)	1	4	6.3	1	4	7		

Cycle (s): 125 — Lost time per cycle (s): 11 — Critical v/c Ratio: .935

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	3	1	1	3	1
Flow rate (veh/h)	337	424	11	467	462	5	251	815	136	180	1462	0
Capacity (veh/h)	321	447	376	392	1078	481	357	1096	335	269	1461	451
Adjusted saturation flow (veh/h)	1770	1863	1568	1770	3547	1583	3437	5074	1549	1770	5074	1567
v/c ratio	1.049	.948	.029	1.192	.428	.011	.703	.744	.406	.671	1	0
g/C ratio	.182	.24	.24	.222	.304	.304	.104	.216	.216	.152	.288	.288
Average back of queue (veh)	17	18.5	.3	28	7.2	.1	5	11	4.3	6.5	24.9	0
Uniform delay (s)	51.2	46.7	36.4	48.7	34.8	30.4	54.1	45.8	42.1	50	44.5	31.7
Incremental delay (s)	63.5	29.8	0	108.9	.1	0	6.1	2.8	.3	6.4	23.6	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	114.7	76.5	36.4	157.6	34.9	30.4	60.2	48.6	42.4	56.4	67.9	31.5
LOS	F	E	D	F	C	C	E	D	D	E	E	C
Approach delay (s)/LOS	92.6	/	F	96.2	/	F	50.3	/	D	66.6	/	E
Intersection delay (s)/ LOS	72.8			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SAEX2LT 2008
Comment: EXIST SAT PK W/2LT LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	287	391	137	297	376	164	173	767	291	154	797	230
RTOR volume (veh/h)			137			164			50			230
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	TR			
WB				L	TR			
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	37	28	40			
Yellow + All red (s)	1	4	6.3	4	7			

Cycle (s): 144.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .718

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	312	425	0	323	409	0	188	834	262	167	866	0
Capacity (veh/h)	667	516	434	667	983	439	286	909	767	221	1618	500
Adjusted saturation flow (veh/h)	3437	1863	1566	3437	3547	1583	3437	3547	1552	1770	5074	1568
v/c ratio	.468	.823	0	.484	.416	0	.658	.917	.341	.758	.536	0
g/C ratio	.194	.277	.277	.194	.277	.277	.083	.256	.494	.125	.319	.319
Average back of queue (veh)	6.1	18.3	0	6.4	7.5	0	4.3	20.8	6.8	7.5	11.2	0
Uniform delay (s)	51.5	48.8	37.7	51.7	42.6	37.7	64.2	52.2	22.2	61	40.4	33.5
Incremental delay (s)	.4	10.4	0	.5	.1	0	5.5	13.8	0	14.1	.4	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	51.9	59.2	37.7	52.2	42.7	37.7	69.7	66	22.2	75.1	40.8	33.5
LOS	D	E	D	D	D	D	E	E	C	E	D	C
Approach delay (s)/LOS	56.2	/	E	46.9	/	D	57.6	/	E	46.3	/	D
Intersection delay (s)/ LOS	52.2			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SA AMB 2013
Comment: 2013 AMBIENT SATURDAY HOUR

Site Information

Jurisdiction/Date: 10/31/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	301	411	144	312	395	172	182	805	305	162	837	242
RTOR volume (veh/h)			140			170			50			240
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	TR			
WB				L	TR			
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	35	30	35			
Yellow + All red (s)	1	4	6.3	4	7			

Cycle (s): 139.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .86

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	327	447	4	339	429	2	198	875	277	176	910	2
Capacity (veh/h)	381	468	393	381	891	398	296	891	794	229	1603	495
Adjusted saturation flow (veh/h)	1770	1863	1566	1770	3547	1583	3437	3547	1552	1770	5074	1568
v/c ratio	.858	.955	.011	.89	.482	.005	.668	.982	.349	.77	.568	.004
g/C ratio	.215	.251	.251	.215	.251	.251	.086	.251	.512	.129	.316	.316
Average back of queue (veh)	14.5	21.5	.1	15.4	8	.1	4.4	22.9	6.8	7.7	11.6	.1
Uniform delay (s)	52.6	51.4	39.2	53	44.4	39.1	61.7	51.8	20.2	58.6	39.7	32.6
Incremental delay (s)	17.5	30.3	0	21.9	.4	0	5.7	25.7	0	14.8	.5	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	70.1	81.7	39.2	74.9	44.8	39.1	67.4	77.5	20.2	73.4	40.2	32.6
LOS	E	F	D	E	D	D	E	E	C	E	D	C
Approach delay (s)/LOS	76.6	/	E	58.1	/	E	64.3	/	E	45.6	/	D
Intersection delay (s)/ LOS	60.4			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SAEX 2008
Comment: 2008 EXISTING SATURDAY HOUR

Site Information

Jurisdiction/Date: 10/31/2008
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	287	391	137	297	376	164	173	767	291	154	797	230
RTOR volume (veh/h)			137			164			50			230
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	TR			
WB				L	TR			
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	37	30	38			
Yellow + All red (s)	1	4	6.3	4	7			

Cycle (s): 144.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .815

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	312	425	0	323	409	0	188	834	262	167	866	0
Capacity (veh/h)	368	491	412	368	934	417	286	909	789	221	1618	500
Adjusted saturation flow (veh/h)	1770	1863	1565	1770	3547	1583	3437	3547	1552	1770	5074	1568
v/c ratio	.848	.866	0	.877	.438	0	.658	.917	.332	.758	.536	0
g/C ratio	.208	.263	.263	.208	.263	.263	.083	.256	.508	.125	.319	.319
Average back of queue (veh)	14.2	19.1	0	15	7.6	0	4.3	20.8	6.6	7.5	11.2	0
Uniform delay (s)	55	50.7	39.2	55.4	44.3	39.2	64.2	52.2	21	61	40.4	33.5
Incremental delay (s)	16.7	15.1	0	20.6	.2	0	5.5	13.8	0	14.1	.4	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	71.7	65.8	39.2	76	44.5	39.2	69.7	66	21	75.1	40.8	33.5
LOS	E	E	D	E	D	D	E	E	C	E	D	C
Approach delay (s)/LOS	68.3	/	E	58.4	/	E	57.3	/	E	46.3	/	D
Intersection delay (s)/ LOS	56.7			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SAEX3NB 2008
Comment: EXIST SAT PK W/ 3NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	287	391	137	297	376	164	173	767	291	154	797	230
RTOR volume (veh/h)			137			164			50			230
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L	TR			
WB				L	TR			
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	35	32	38			
Yellow + All red (s)	1	4	6.3	4	7			

Cycle (s): 144.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .737

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	3		1	3	1
Flow rate (veh/h)	312	425	0	323	409	0	188	834		167	866	0
Capacity (veh/h)	392	491	412	392	934	417	286	1231		221	1547	478
Adjusted saturation flow (veh/h)	1770	1863	1565	1770	3547	1583	3437	5074		1770	5074	1568
v/c ratio	.795	.866	0	.823	.438	0	.658	.677		.758	.56	0
g/C ratio	.222	.263	.263	.222	.263	.263	.083	.243		.125	.305	.305
Average back of queue (veh)	13.5	19.1	0	14.3	7.6	0	4.3	12.2		7.5	11.5	0
Uniform delay (s)	53.1	50.7	39.2	53.4	44.3	39.2	64.2	49.5		61	42	34.9
Incremental delay (s)	10.8	15.1	0	13.2	.2	0	5.5	1.5		14.1	.5	0
Initial queue delay (s)	0	0	0	0	0	0	0	0		0	0	0
Delay (s)	63.9	65.8	39.2	66.6	44.5	39.2	69.7	51		75.1	42.5	34.9
LOS	E	E	D	E	D	D	E	D		E	D	C
Approach delay (s)/LOS	65	/	E	54.2	/	D	54.5	/	D	47.8	/	D
Intersection delay (s)/ LOS	54.7			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SATOT2LT 2013
Comment: 2013 TOT SAT W/2LT

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	350	465	144	415	450	172	182	895	420	162	935	290
RTOR volume (veh/h)			140			170			50			240
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	9	5	38	18	4	40		
Yellow + All red (s)	1	4	6.3	4	4	7		

Cycle (s): 140.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .858

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	1	1	2	2	1	2	2	1	1	3	1
Flow rate (veh/h)	380	505	4	451	489	2	198	973	402	176	1016	54
Capacity (veh/h)	441	531	447	637	1213	542	220	961	690	189	1700	526
Adjusted saturation flow (veh/h)	3437	1863	1567	3437	3547	1583	3437	3547	1554	1770	5074	1569
v/c ratio	.863	.952	.01	.708	.403	.004	.897	1.013	.583	.931	.598	.103
g/C ratio	.128	.285	.285	.185	.342	.342	.064	.271	.444	.107	.335	.335
Average back of queue (veh)	9.1	24.2	.1	9.5	8.1	.1	5.1	26.5	12.7	8.8	13.1	1.5
Uniform delay (s)	59.9	49.2	36	53.6	35.2	30.4	65.2	51.2	29.3	62.1	38.8	32.1
Incremental delay (s)	16	27.4	0	3.6	.1	0	34.4	32.2	1.3	46	.6	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	75.9	76.6	36	57.2	35.3	30.4	99.6	83.4	30.6	108.1	39.4	32.1
LOS	E	E	D	E	D	C	F	F	C	F	D	C
Approach delay (s)/LOS	76.1	/	E	45.8	/	D	71.9	/	E	48.8	/	D
Intersection delay (s)/ LOS	61.2			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SATO3N2L 2013
Comment: 2013 TOT SAT W/3NB 2LT

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	350	465	144	415	450	172	182	895	420	162	935	290
RTOR volume (veh/h)			140			170			50			240
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	10	5	32	23	4	35		
Yellow + All red (s)	1	4	6.3	4	4	7		

Cycle (s): 135.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .627

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	2	2	1	2	2	1	2	3	1	1	3	1
Flow rate (veh/h)	380	505	4	451	489	2	198	973	402	176	1016	54
Capacity (veh/h)	584	917	405	787	1127	503	254	1200	708	209	1538	475
Adjusted saturation flow (veh/h)	3437	3547	1566	3437	3547	1583	3437	5074	1563	1770	5074	1568
v/c ratio	.651	.551	.011	.573	.434	.004	.779	.811	.568	.841	.661	.114
g/C ratio	.17	.259	.259	.229	.318	.318	.074	.237	.453	.118	.303	.303
Average back of queue (veh)	7.6	9.3	.1	8.4	8.1	.1	4.5	14.6	12	7.9	13.4	1.5
Uniform delay (s)	52.4	43.4	37.3	46.3	36.5	31.5	61.6	48.8	27.2	58.4	41.1	34
Incremental delay (s)	2.6	.7	0	1	.1	0	14.3	4.3	1.1	25.4	1.1	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	55	44.1	37.3	47.3	36.6	31.5	75.9	53.1	28.3	83.8	42.2	34
LOS	D	D	D	D	D	C	E	D	C	F	D	C
Approach delay (s)/LOS	48.7	/	D	41.7	/	D	49.6	/	D	47.7	/	D
Intersection delay (s)/ LOS	47.3			/			D					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SA TOT 2013
Comment: 2013 TOTAL SATURDAY HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	350	465	144	415	450	172	182	895	420	162	935	290
RTOR volume (veh/h)			140			170			50			240
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	35	23	4	35		
Yellow + All red (s)	1	4	6.3	4	4	7		

Cycle (s): 140.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .994

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	2	1	1	3	1
Flow rate (veh/h)	380	505	4	451	489	2	198	973	402	176	1016	54
Capacity (veh/h)	290	465	391	391	1087	485	294	885	711	227	1591	492
Adjusted saturation flow (veh/h)	1770	1863	1566	1770	3547	1583	3437	3547	1552	1770	5074	1568
v/c ratio	1.311	1.088	.011	1.154	.45	.004	.673	1.1	.566	.776	.639	.111
g/C ratio	.164	.249	.249	.221	.306	.306	.086	.249	.458	.128	.314	.314
Average back of queue (veh)	27.7	28.8	.1	27.9	8.6	.1	4.4	29.5	12.4	7.7	13.6	1.6
Uniform delay (s)	58.7	52.7	39.6	54.7	39.1	33.8	62.2	52.7	27.8	59.2	41.3	34.2
Incremental delay (s)	162.6	67.5	0	94.5	.2	0	5.9	61.2	1.1	15.4	.9	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	221.3	120.2	39.6	149.2	39.3	33.8	68.1	113.9	28.9	74.6	42.2	34.2
LOS	F	F	D	F	D	C	E	F	C	E	D	C
Approach delay (s)/LOS	163	/	F	91.9	/	F	86.4	/	F	46.5	/	D
Intersection delay (s)/ LOS	91.4			/			F					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SATO3NB 2013
Comment: 2013 TOT SAT W/3NB LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: PUAINAKO S
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	350	465	144	415	450	172	182	895	420	162	935	290
RTOR volume (veh/h)			140			170			50			240
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			0			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB				L		TR		
WB				L	LTR	TR		
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	5	32	26	4	35		
Yellow + All red (s)	1	4	6.3	4	4	7		

Cycle (s): 140.3 | Lost time per cycle (s): 13.3 | Critical v/c Ratio: .903

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	T	R	L	T	R	L	T	R	L	T	R
No. of lanes	1	1	1	1	2	1	2	3	1	1	3	1
Flow rate (veh/h)	380	505	4	451	489	2	198	973	402	176	1016	54
Capacity (veh/h)	328	465	391	429	1087	485	294	1157	710	227	1483	458
Adjusted saturation flow (veh/h)	1770	1863	1566	1770	3547	1583	3437	5074	1549	1770	5074	1567
v/c ratio	1.16	1.088	.011	1.052	.45	.004	.673	.841	.567	.776	.685	.119
g/C ratio	.185	.249	.249	.242	.306	.306	.086	.228	.458	.128	.292	.292
Average back of queue (veh)	23.8	28.8	.1	24.7	8.6	.1	4.4	15.5	12.4	7.7	14.2	1.6
Uniform delay (s)	57.2	52.7	39.6	53.2	39.1	33.8	62.2	51.7	27.8	59.2	43.9	36.4
Incremental delay (s)	100.5	67.5	0	57.7	.2	0	5.9	5.7	1.1	15.4	1.3	0
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0	0	0
Delay (s)	157.7	120.2	39.6	110.9	39.3	33.8	68.1	57.4	28.9	74.6	45.2	36.4
LOS	F	F	D	F	D	C	E	E	C	E	D	D
Approach delay (s)/LOS	135.8	/	F	73.6	/	E	51.5	/	D	49	/	D
Intersection delay (s)/ LOS	71.4			/			E					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM AMB 2013
Comment: 2013 AMBIENT AM PEAK HOUR

Site Information

Jurisdiction/Date: 10/29/2008
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	15	71	89	112	91	246	251	1363	198	146	480	12
RTOR volume (veh/h)			40		75			50				5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R	R			LTR			
WB	R			LTR				
NB	L	LTR	TR	R				
SB	L		TR					
Green (s)	8	17	23	19.8	12			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 105 | Lost time per cycle (s): 19 | Critical v/c Ratio: .719

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	93	53	82	139	186	273	1482	161	159	529
Capacity (veh/h)	211	673	334	346	409	438	1486	1035	262	1106
Adjusted saturation flow (veh/h)	1842	1571	1770	1836	1546	1770	3547	1552	3437	5048
v/c ratio	.444	.079	.244	.402	.454	.623	.997	.155	.606	.479
g/C ratio	.114	.429	.189	.189	.265	.248	.419	.667	.076	.219
Average back of queue (veh)	2.8	1	2.1	3.8	4.9	7.4	30.4	7	2.6	5.1
Uniform delay (s)	43.4	17.7	36.2	37.4	32.3	35.1	30.4	6.5	47	35.8
Incremental delay (s)	.9	0	0	.2	.5	2.7	22.6	0	4	.3
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	44.3	17.7	36.2	37.6	32.8	37.8	49.2	2.5	51	36.1
LOS	D	B	D	D	C	D	D	A	D	D
Approach delay (s)/LOS	34.7 / C		35.1 / D			43.7 / D			39.5 / D	
Intersection delay (s)/ LOS	41.2 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM TOT 2013
Comment: 2013 TOTAL AM PEAK HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	15	79	89	120	96	274	251	1340	240	175	466	12
RTOR volume (veh/h)			40			75			60			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R	R			LTR			
WB	R			LTR				
NB	L	LTR	TR	R				
SB	L		TR					
Green (s)	8	17	23	19.8	12			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 105 | Lost time per cycle (s): 19 | Critical v/c Ratio: .74

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	102	53	87	147	216	273	1457	196	190	514
Capacity (veh/h)	211	673	334	346	409	438	1486	1035	262	1106
Adjusted saturation flow (veh/h)	1844	1571	1770	1836	1546	1770	3547	1552	3437	5048
v/c ratio	.485	.079	.262	.426	.528	.623	.98	.189	.726	.465
g/C ratio	.114	.429	.189	.189	.265	.248	.419	.667	.076	.219
Average back of queue (veh)	3.1	1	2.3	4.1	5.9	7.4	28.7	.9	3.3	4.9
Uniform delay (s)	43.6	17.7	36.4	37.6	33	35.1	30.1	6.7	47.4	35.6
Incremental delay (s)	1.6	0	0	.4	1.3	2.7	18.7	0	9.7	.2
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	45.2	17.7	36.4	38	34.3	37.8	45	2.6	57.1	35.8
LOS	D	B	D	D	C	D	D	A	E	D
Approach delay (s)/LOS	35.8 / D		35.9 / D			39.6 / D			41.6 / D	
Intersection delay (s)/ LOS	39.4 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMEX 2008
Comment: 2008 EXISTING AM PEAK HOUR

Site Information

Jurisdiction/Date: 10/1/2008
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	14	68	85	107	87	234	239	1298	189	139	457	110
RTOR volume (veh/h)			40			75			50			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R	R			LTR			
WB				LTR				
NB	L	LTR	TR	R				
SB	L		TR					
Green (s)	8	17	21	17.8	11			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 100 | Lost time per cycle (s): 18 | Critical v/c Ratio: .734

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	89	49	78	133	173	260	1411	151	151	611
Capacity (veh/h)	203	691	315	327	275	460	1490	1025	275	1028
Adjusted saturation flow (veh/h)	1843	1571	1770	1836	1545	1770	3547	1552	3437	4897
v/c ratio	.44	.071	.247	.407	.629	.565	.947	.147	.55	.594
g/C ratio	.11	.44	.178	.178	.178	.26	.42	.66	.08	.21
Average back of queue (veh)	2.5	.8	2	3.5	5	6.4	24.8	.7	2.3	6
Uniform delay (s)	41.6	16.2	35.3	36.4	38	32.1	27.9	6.4	44.3	35.7
Incremental delay (s)	.9	0	0	.3	4.5	1.6	12.9	0	2.3	.9
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	42.5	16.2	35.3	36.7	42.5	33.7	37.3	2.6	46.6	36.6
LOS	D	B	D	D	D	C	D	A	D	D
Approach delay (s)/LOS	33.2 / C		39.1 / D			33.9 / C			38.5 / D	
Intersection delay (s)/ LOS	35.6 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AMEX3NB 2008
Comment: EXIST AM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	14	68	85	107	87	234	239	1298	189	139	457	110
RTOR volume (veh/h)			40			75			50			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R	R			LTR			
WB				LTR				
NB	L	LTR	TR	R				
SB	L		TR					
Green (s)	8	13	25	17.8	11			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 100 | Lost time per cycle (s): 18 | Critical v/c Ratio: .589

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	TR		L	TR
No. of lanes	1	1	1	1	1	1	3		2	3
Flow rate (veh/h)	89	49	78	133	173	260	1411		151	611
Capacity (veh/h)	203	628	315	327	275	389	2126		275	1225
Adjusted saturation flow (veh/h)	1843	1571	1770	1836	1545	1770	5061		3437	4901
v/c ratio	.44	.078	.247	.407	.629	.667	.664		.55	.499
g/C ratio	.11	.4	.178	.178	.178	.22	.42		.08	.25
Average back of queue (veh)	2.5	.9	2	3.5	5	7.1	11.3		2.3	5.4
Uniform delay (s)	41.6	18.6	35.3	36.4	38	35.7	23.3		44.3	32.1
Incremental delay (s)	.9	0	0	.3	4.5	4.3	.8		2.3	.3
Initial queue delay (s)	0	0	0	0	0	0	0		0	0
Delay (s)	42.5	18.6	35.3	36.7	42.5	40	21.2		46.6	32.4
LOS	D	B	D	D	D	D	C		D	C
Approach delay (s)/LOS	34 / C		39.1 / D			24.1 / C			35.2 / D	
Intersection delay (s)/ LOS	29.4 / C									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMEX3NB 2008
Comment: EXIST PM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Pretimed | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	20	209	275	412	88	304	83	696	259	369	1133	27
RTOR volume (veh/h)			70			75			60			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	10	3	20	17.8	19			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 95 | Lost time per cycle (s): 19 | Critical v/c Ratio: .902

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	TR		L	TR
No. of lanes	1	1	1	1	1	1	3		2	3
Flow rate (veh/h)	249	223	300	243	249	90	757		401	1255
Capacity (veh/h)	371	595	332	339	452	186	1065		506	1434
Adjusted saturation flow (veh/h)	1853	1571	1770	1808	1546	1770	5061		3437	5045
v/c ratio	.672	.374	.905	.719	.55	.484	.71		.792	.876
g/C ratio	.2	.379	.187	.187	.293	.105	.211		.147	.284
Average back of queue (veh)	7.2	4.7	10.7	7.3	6.3	2.6	8.2		6.6	15
Uniform delay (s)	35.1	21.3	37.8	36.2	28.3	40.1	34.8		39.1	32.4
Incremental delay (s)	9.3	1.8	30.3	12.4	4.8	8.7	4		12	7.8
Initial queue delay (s)	0	0	0	0	0	0	0		0	0
Delay (s)	44.4	23.1	68.1	48.6	33.1	48.8	38.8		51.1	40.1
LOS	D	C	E	D	C	D	D		D	D
Approach delay (s)/LOS	34.4 / C		51.1 / D			39.9 / D			42.8 / D	
Intersection delay (s)/ LOS	42.8 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM AMB 2013
Comment: 2013 AMBIENT PM PEAK HOUR

Site Information

Jurisdiction/Date: 11/1/2008
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Pretimed | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	21	220	289	433	92	319	87	731	272	387	1190	28
RTOR volume (veh/h)			70			75			60			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	13	3	29	23.8	21			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 115 | Lost time per cycle (s): 19 | Critical v/c Ratio: .913

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	262	238	315	255	265	95	795	230	421	1318
Capacity (veh/h)	338	560	366	374	495	200	894	388	508	1579
Adjusted saturation flow (veh/h)	1853	1571	1770	1808	1548	1770	3547	1540	3437	5045
v/c ratio	.774	.425	.861	.682	.535	.473	.888	.593	.828	.835
g/C ratio	.183	.357	.207	.207	.32	.113	.252	.252	.148	.313
Average back of queue (veh)	9.8	6.4	12.6	8.9	7.9	3.2	16.8	7.4	8.5	17.4
Uniform delay (s)	44.7	28.1	44	42.1	32.1	47.8	41.4	37.8	47.6	36.7
Incremental delay (s)	15.8	2.4	22.4	9.7	4.1	7.8	12.8	6.5	14.4	5.4
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	60.5	30.5	66.4	51.8	36.2	55.6	54.2	44.3	62	41.2
LOS	E	C	E	D	D	E	D	D	E	D
Approach delay (s)/LOS	46.2 / D		52.4 / D			52.3 / D			46.3 / D	
Intersection delay (s)/ LOS	49.1 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: AM TOT 3NB 2013
Comment: 2013 TOTAL AM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	15	79	89	120	96	274	251	1340	240	175	466	12
RTOR volume (veh/h)			40			75			60			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R	R			LTR			
WB	R			LTR				
NB	L	LTR	TR	R				
SB	L		TR					
Green (s)	8	17	23	19.8	12			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 105 | Lost time per cycle (s): 19 | Critical v/c Ratio: .589

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	3	1	2	3
Flow rate (veh/h)	102	53	87	147	216	273	1457	196	190	514
Capacity (veh/h)	211	673	334	346	409	438	2126	1035	262	1106
Adjusted saturation flow (veh/h)	1844	1571	1770	1836	1546	1770	5074	1552	3437	5048
v/c ratio	.485	.079	.262	.426	.528	.623	.685	.189	.726	.465
g/C ratio	.114	.429	.189	.189	.265	.248	.419	.667	.076	.219
Average back of queue (veh)	3.1	1	2.3	4.1	5.9	7.4	12.5	.9	3.3	4.9
Uniform delay (s)	43.6	17.7	36.4	37.6	33	35.1	24.9	6.7	47.4	35.6
Incremental delay (s)	1.6	0	0	.4	1.3	2.7	.9	0	9.7	.2
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	45.2	17.7	36.4	38	34.3	37.8	22.6	2.6	57.1	35.8
LOS	D	B	D	D	C	D	C	A	E	D
Approach delay (s)/LOS	35.8 / D		35.9 / D			22.7 / C			41.6 / D	
Intersection delay (s)/ LOS	29.3 / C									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PMEX 2008
Comment: 2008 EXISTING PM PEAK HOUR

Site Information

Jurisdiction/Date: 10/7/2008
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Pretimed | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	20	209	275	412	88	304	83	696	259	369	1133	27
RTOR volume (veh/h)			70			75			60			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	10	3	20	17.8	19			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 95 | Lost time per cycle (s): 19 | Critical v/c Ratio: .902

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	249	223	300	243	249	90	757	216	401	1255
Capacity (veh/h)	371	595	332	339	452	186	747	323	506	1434
Adjusted saturation flow (veh/h)	1853	1571	1770	1808	1546	1770	3547	1534	3437	5045
v/c ratio	.672	.374	.905	.719	.55	.484	1.013	.67	.792	.876
g/C ratio	.2	.379	.187	.187	.293	.105	.211	.211	.147	.284
Average back of queue (veh)	7.2	4.7	10.7	7.3	6.3	2.6	16.3	6.3	6.6	15
Uniform delay (s)	35.1	21.3	37.8	36.2	28.3	40.1	37.5	34.5	39.1	32.4
Incremental delay (s)	9.3	1.8	30.3	12.4	4.8	8.7	36.3	10.6	12	7.8
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	44.4	23.1	68.1	48.6	33.1	48.8	73.8	45.1	51.1	40.1
LOS	D	C	E	D	C	D	E	D	D	D
Approach delay (s)/LOS	34.4 / C		51.1 / D			65.8 / E			42.8 / D	
Intersection delay (s)/ LOS	49.6 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SAEX 2008
Comment: 2008 EXISTING SATURDAY HOUR

Site Information

Jurisdiction/Date: 10/7/2008
EB/WB Street: EAST MAKAA
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	13	158	156	393	79	345	97	778	334	453	714	27
RTOR volume (veh/h)			50			100			80			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	10	10	30.8	23	17			
Yellow + All red (s)	4	1	6.2	7	7			

Cycle (s): 116 | Lost time per cycle (s): 24.2 | Critical v/c Ratio: .827

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	186	115	286	227	266	105	846	276	492	800
Capacity (veh/h)	272	460	351	358	440	153	942	409	711	1815
Adjusted saturation flow (veh/h)	1854	1571	1770	1807	1547	1770	3547	1541	3437	5036
v/c ratio	.684	.25	.816	.633	.605	.691	.898	.675	.693	.441
g/C ratio	.147	.293	.198	.198	.284	.086	.266	.266	.207	.36
Average back of queue (veh)	6.4	3	10.4	7.4	8.1	3.8	16.7	8.5	8.2	6.7
Uniform delay (s)	47	31.3	44.5	42.6	35.9	51.5	41.1	38.1	42.6	28.2
Incremental delay (s)	6.9	0	13.9	3.6	2.4	12.5	11.3	4.4	2.9	.1
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	53.9	31.3	58.4	46.2	38.3	64	52.4	42.5	45.5	26.5
LOS	D	C	E	D	D	E	D	D	D	C
Approach delay (s)/LOS	45.2 / D		48 / D			51.2 / D			33.7 / C	
Intersection delay (s)/ LOS	43.7 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SAEX3NB 2008
Comment: EXIST SAT PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/16/2009
EB/WB Street: EAST MAKAA
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	13	158	156	393	79	345	97	778	334	453	714	27
RTOR volume (veh/h)			50			100			80			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	10	25.8	23	17				
Yellow + All red (s)	4	1	6.2	7	7			

Cycle (s): 111 | Lost time per cycle (s): 19 | Critical v/c Ratio: .52

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	TR		L	TR
No. of lanes	1	1	1	1	1	1	3		2	3
Flow rate (veh/h)	186	115	286	227	266	105	846		492	800
Capacity (veh/h)	284	481	367	374	460	159	1176		743	1670
Adjusted saturation flow (veh/h)	1854	1571	1770	1807	1548	1770	5061		3437	5036
v/c ratio	.655	.239	.781	.606	.579	.661	.719		.663	.479
g/C ratio	.153	.306	.207	.207	.297	.09	.232		.216	.332
Average back of queue (veh)	6.1	2.8	9.7	7	7.6	3.6	9.6		7.7	6.9
Uniform delay (s)	44.2	28.8	41.6	39.9	33.1	48.9	39.3		39.8	29.5
Incremental delay (s)	5.4	0	10.4	2.8	1.8	9.8	2.2		2.2	.2
Initial queue delay (s)	0	0	0	0	0	0	0		0	0
Delay (s)	49.6	28.8	52	42.7	34.9	58.7	41.5		42	28.5
LOS	D	C	D	D	C	E	D		D	C
Approach delay (s)/LOS	41.7 / D		43.5 / D			43.4 / D			33.6 / C	
Intersection delay (s)/ LOS	39.5 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM TOT 2013
Comment: 2013 TOTAL PM PEAK HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Pretimed | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	21	249	289	555	120	465	87	660	385	520	1125	28
RTOR volume (veh/h)			70			90			90			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R	R		LTR				
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	8	29	26.8	24			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 125 | Lost time per cycle (s): 21.2 | Critical v/c Ratio: .751

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	293	238	404	330	408	95	717	321	565	1248
Capacity (veh/h)	356	540	379	388	592	170	823	762	577	1655
Adjusted saturation flow (veh/h)	1854	1571	1770	1808	1549	1770	3547	1537	3437	5044
v/c ratio	.824	.44	1.065	.85	.688	.557	.872	.421	.979	.754
g/C ratio	.192	.344	.214	.214	.382	.096	.232	.496	.168	.328
Average back of queue (veh)	12.3	7.1	21.8	14	13.9	3.6	16.2	7.9	14.4	16.1
Uniform delay (s)	48.5	31.7	49.1	47.2	32.4	54	46.2	20.1	51.8	37.5
Incremental delay (s)	19.1	2.6	64.6	20.2	6.4	12.5	12.3	1.7	32.6	3.2
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	67.6	34.3	113.7	67.4	38.8	66.5	58.5	21.8	84.4	39.3
LOS	E	C	F	E	D	E	E	C	F	D
Approach delay (s)/LOS	52.7 / D		73.6 / E			48.8 / D			53.4 / D	
Intersection delay (s)/ LOS	57.1 / E									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: PM TOT 3NB 2013
Comment: 2013 TOT PM PK W/3NB LANES

Site Information

Jurisdiction/Date: 2/23/2009
EB/WB Street: MAKAALA ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Pretimed | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	21	249	289	555	120	465	87	660	385	520	1125	28
RTOR volume (veh/h)			70			90			90			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R	R		LTR				
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	10	11	24	27.8	22			
Yellow + All red (s)	1	4	6.2	7	7			

Cycle (s): 120 | Lost time per cycle (s): 21.2 | Critical v/c Ratio: .683

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	3	1	2	3
Flow rate (veh/h)	293	238	404	330	408	95	717	321	565	1248
Capacity (veh/h)	340	511	410	419	644	147	1015	740	630	1639
Adjusted saturation flow (veh/h)	1854	1571	1770	1808	1551	1770	5074	1532	3437	5044
v/c ratio	.863	.466	.986	.787	.633	.641	.707	.433	.897	.761
g/C ratio	.183	.325	.232	.232	.415	.083	.2	.483	.183	.325
Average back of queue (veh)	12.3	7.1	19.2	12.6	12.5	3.7	9.7	7.8	12.5	15.6
Uniform delay (s)	47.5	32.2	45.9	43.3	27.9	53.3	44.7	20.3	47.9	36.3
Incremental delay (s)	24	3	41.1	13.8	4.7	19.5	4.1	1.8	18	3.4
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	71.5	35.2	87	57.1	32.6	72.8	48.8	22.1	65.9	38.5
LOS	E	D	F	E	C	E	D	C	E	D
Approach delay (s)/LOS	55.3 / E		58.9 / E			43.2 / D			47 / D	
Intersection delay (s)/ LOS	50 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SA TOT 3NB 2013
Comment: 2013 TOT SATURDAY W/3 NB LANES

Site Information

Jurisdiction/Date: 2/24/2009
EB/WB Street: EAST MAKAA
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	14	201	164	565	110	560	102	715	490	680	665	28
RTOR volume (veh/h)			50			100			100			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R	R		LTR				
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	15	31	33	22			
Yellow + All red (s)	4	1	6.2	7	7			

Cycle (s): 138.2 | Lost time per cycle (s): 24.2 | Critical v/c Ratio: .729

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	3	1	2	3
Flow rate (veh/h)	234	124	411	322	500	111	777	424	739	748
Capacity (veh/h)	295	466	423	431	718	154	1138	780	771	1712
Adjusted saturation flow (veh/h)	1856	1571	1770	1806	1551	1770	5074	1536	3437	5033
v/c ratio	.791	.266	.974	.747	.696	.722	.683	.543	.959	.437
g/C ratio	.159	.297	.239	.239	.463	.087	.224	.508	.224	.34
Average back of queue (veh)	10	3.8	20.3	12.9	16.8	4.8	10.7	9.2	18.4	7.7
Uniform delay (s)	55.9	37.1	52.2	48.7	29.4	61.5	49.1	23.1	53	35.3
Incremental delay (s)	13.6	0	36.8	7	3	15.3	1.7	.8	22.8	.1
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	69.5	37.1	89	55.7	32.4	76.8	50.8	18.2	75.8	33.8
LOS	E	D	F	E	C	E	D	B	E	C
Approach delay (s)/LOS	58.3 / E		57.4 / E			42.5 / D			54.6 / D	
Intersection delay (s)/ LOS	52.1 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SA AMB 2013
Comment: 2013 AMBIENT SATURDAY HOUR

Site Information

Jurisdiction/Date: 10/29/2008
EB/WB Street: EAST MAKAA
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	14	166	164	413	83	362	102	817	351	476	750	28
RTOR volume (veh/h)			50			100			90			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R			LTR				
NB	L		TR					
SB	L	LTR	TR					
Green (s)	10	10	32.8	23	17			
Yellow + All red (s)	4	1	6.2	7	7			

Cycle (s): 118 | Lost time per cycle (s): 24.2 | Critical v/c Ratio: .869

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	196	124	301	238	285	111	888	284	517	840
Capacity (veh/h)	267	453	345	352	433	150	986	429	699	1869
Adjusted saturation flow (veh/h)	1854	1571	1770	1807	1547	1770	3547	1543	3437	5036
v/c ratio	.733	.274	.872	.677	.658	.739	.901	.662	.74	.449
g/C ratio	.144	.288	.195	.195	.28	.085	.278	.278	.203	.371
Average back of queue (veh)	7.1	3.3	11.7	8.1	9.1	4.2	17.7	8.7	9.1	7.1
Uniform delay (s)	48.3	32.5	46.1	44.1	37.5	52.7	41	37.7	44.1	28
Incremental delay (s)	9.9	0	20.9	5.1	3.7	17.6	11.2	3.8	4.2	.1
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	58.2	32.5	67	49.2	41.2	70.3	52.2	41.5	48.3	26
LOS	E	C	E	D	D	E	D	D	D	C
Approach delay (s)/LOS	48.2 / D		52.9 / D			51.4 / D			34.5 / C	
Intersection delay (s)/ LOS	45.4 / D									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: M&E PAC
Analysis Period/Year: SA TOT 2013
Comment: 2013 TOTAL SATURDAY HOUR

Site Information

Jurisdiction/Date: 2/15/2009
EB/WB Street: EAST MAKAA
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	14	201	164	565	110	560	102	715	490	680	665	28
RTOR volume (veh/h)			50			100			100			5
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	4	4	4	4	4	4
Approach pedestrian volume (p/h)		0			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	R				LTR			
WB	R	R		LTR				
NB	L		TR	R				
SB	L	LTR	TR					
Green (s)	12	12	33	27	22			
Yellow + All red (s)	4	1	6.2	7	7			

Cycle (s): 131.2 | Lost time per cycle (s): 24.2 | Critical v/c Ratio: .819

Intersection Performance

	EB		WB			NB			SB	
Lane group configuration	LT	R	L	LT	R	L	T	R	L	TR
No. of lanes	1	1	1	1	1	1	2	1	2	3
Flow rate (veh/h)	234	124	411	322	500	111	777	424	739	748
Capacity (veh/h)	311	491	364	372	649	162	892	777	733	1765
Adjusted saturation flow (veh/h)	1856	1571	1770	1806	1548	1770	3547	1540	3437	5033
v/c ratio	.751	.252	1.13	.867	.77	.685	.871	.546	1.008	.424
g/C ratio	.168	.313	.206	.206	.419	.091	.252	.505	.213	.351
Average back of queue (veh)	9.3	3.6	23.7	13.6	17.7	4.4	16.7	8.9	18.9	7.1
Uniform delay (s)	52	33.7	52.1	50.4	32.7	57.8	47.1	22.2	51.6	32.5
Incremental delay (s)	9.8	0	87.2	19	5.7	11.4	9.4	.8	35.2	.1
Initial queue delay (s)	0	0	0	0	0	0	0	0	0	0
Delay (s)	61.8	33.7	139.3	69.4	38.4	69.2	56.5	17.7	86.8	30.7
LOS	E	C	F	E	D	E	E	B	F	C
Approach delay (s)/LOS	52 / D		80.1 / F			45 / D			58.6 / E	
Intersection delay (s)/ LOS	60.1 / E									

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOT SAT / 2013
Comment: 2013 TOTAL SAT

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: POHAKU ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)						590		1240	185	635	1145	
RTOR volume (veh/h)						50			30			0
Peak-hour factor						.92		.92	.92	.92	.92	
Heavy vehicles (%)						2		2	2	2	2	
Start-up lost time, l_1 (s)						2		2	2	2	2	
Extension of effective green, e (s)						2		2	2	2	2	
Arrival type, AT						3		3	3	3	3	
Approach pedestrian volume (p/h)					10			10			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB		R						
NB	TRP							
SB	T	LT						
Green (s)	70	69						
Yellow + All red (s)	6	5						

Cycle (s): 150 | Lost time per cycle (s): 6 | Critical v/c Ratio: .802

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration						R		T	R	L	T	
No. of lanes						1		2	1	1	2	
Flow rate (veh/h)						587		1348	168	690	1245	
Capacity (veh/h)						718		1655	733	814	3415	
Adjusted saturation flow (veh/h)						1561		3547	1571	1770	3533	
v/c ratio						.818		.814	.23	.848	.364	
g/C ratio						.46		.467	.467	.46	.967	
Average back of queue (veh)						24.1		28.6	4.4	29.2	2.2	
Uniform delay (s)						35.1		34.4	23.9	35.9	.1	
Incremental delay (s)						7.4		3.3	0	8.4	0	
Initial queue delay (s)						0		0	0	0	0	
Delay (s)						42.5		37.7	23.9	44.3	.1	
LOS						D		D	C	D	A	
Approach delay (s)/LOS		/		42.5	/	D	36.2	/	D	15.9	/	B
Intersection delay (s)/ LOS		27.4		/		C						

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOTAM / 2013
Comment: 2013 TOT W/PROJ AM WITH RECHANNEL

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: MAKAALA ST
NB/SB Street: WAIAKEA CT E

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)		301	15		335	84	11	6		66	14	
RTOR volume (veh/h)			5			20			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92		.92	.92	
Heavy vehicles (%)	2	2	2	2	2	2	2	2		2	2	
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2		2	2	
Extension of effective green, e (s)	2	2	2	2	2	2	2	2		2	2	
Arrival type, AT	3	3	3	3	3	3	3	3		3	3	
Approach pedestrian volume (p/h)		10			10			10			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	TRP							
WB	TRP							
NB		L	LTP					
SB		L	LT					
Green (s)	35	10	4					
Yellow + All red (s)	5	1	5					

Cycle (s): 60 | Lost time per cycle (s): 11 | Critical v/c Ratio: .214

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		TR			TR		L	T		L	T	
No. of lanes		2			2		1	1		1	1	
Flow rate (veh/h)		338			434		12	7		72	15	
Capacity (veh/h)		2050			2008		493	123		498	123	
Adjusted saturation flow (veh/h)		3515			3443		1770	1848		1770	1848	
v/c ratio		.165			.216		.024	.053		.144	.124	
g/C ratio		.583			.583		.317	.067		.317	.067	
Average back of queue (veh)		1.5			2		.1	.1		.9	.3	
Uniform delay (s)		5.8			6		14.1	26.2		14.6	26.4	
Incremental delay (s)		0			0		0	0		0	0	
Initial queue delay (s)		0			0		0	0		0	0	
Delay (s)		5.8			6		14.1	26.2		14.6	26.4	
LOS		A			A		B	C		B	C	
Approach delay (s)/LOS	5.8	/	A	6	/	A	18.4	/	B	16.7	/	B
Intersection delay (s)/ LOS		7.2		/		A						

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOT AM / 2013
Comment: 2013 TOTAL AM

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: POHAKU ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)						120		1480	25	235	705	
RTOR volume (veh/h)						10			5			0
Peak-hour factor						.92		.92	.92	.92	.92	
Heavy vehicles (%)						2		2	2	2	2	
Start-up lost time, l_1 (s)						2		2	2	2	2	
Extension of effective green, e (s)						2		2	2	2	2	
Arrival type, AT						3		3	3	3	3	
Approach pedestrian volume (p/h)					10			10			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB		R						
NB	TRP							
SB	T	LT						
Green (s)	70	24						
Yellow + All red (s)	6	5						

Cycle (s): 105 | Lost time per cycle (s): 6 | Critical v/c Ratio: .634

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration						R		T	R	L	T	
No. of lanes						1		2	1	1	2	
Flow rate (veh/h)						120		1609	22	255	766	
Capacity (veh/h)						354		2364	1047	404	3365	
Adjusted saturation flow (veh/h)						1550		3547	1571	1770	3533	
v/c ratio						.337		.68	.021	.632	.228	
g/C ratio						.229		.667	.667	.229	.952	
Average back of queue (veh)						3.1		16.8	.2	7.4	1	
Uniform delay (s)						33.9		10.7	5.9	36.5	.2	
Incremental delay (s)						0		.8	0	3.2	0	
Initial queue delay (s)						0		0	0	0	0	
Delay (s)						33.9		11.5	5.9	39.7	.2	
LOS						C		B	A	D	A	
Approach delay (s)/LOS		/		33.9	/	C	11.4	/	B	10	/	A
Intersection delay (s)/ LOS		11.9		/		B						

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOT PM / 2013
Comment: 2013 TOTAL PM

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: POHAKU ST
NB/SB Street: KANOELEHUA

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)						260		1040	40	400	1680	
RTOR volume (veh/h)						10			5			0
Peak-hour factor						.92		.92	.92	.92	.92	
Heavy vehicles (%)						2		2	2	2	2	
Start-up lost time, l_1 (s)						2		2	2	2	2	
Extension of effective green, e (s)						2		2	2	2	2	
Arrival type, AT						3		3	3	3	3	
Approach pedestrian volume (p/h)					10			10			0	
Approach bicycle volume (bic/h)					0			0			0	
Left/right parking (Y or N)		/		N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB								
WB		R						
NB	TRP							
SB	T	LT						
Green (s)	70	39						
Yellow + All red (s)	6	5						

Cycle (s): 120 | Lost time per cycle (s): 6 | Critical v/c Ratio: .594

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration						R		T	R	L	T	
No. of lanes						1		2	1	1	2	
Flow rate (veh/h)						272		1130	38	435	1826	
Capacity (veh/h)						506		2069	916	575	3386	
Adjusted saturation flow (veh/h)						1557		3547	1571	1770	3533	
v/c ratio						.537		.546	.042	.756	.539	
g/C ratio						.325		.583	.583	.325	.958	
Average back of queue (veh)						8		13.1	.6	14.6	4.1	
Uniform delay (s)						33.1		15.3	10.7	36.2	.2	
Incremental delay (s)						1.1		.3	0	5.7	.2	
Initial queue delay (s)						0		0	0	0	0	
Delay (s)						34.2		15.6	10.7	41.9	.4	
LOS						C		B	B	D	A	
Approach delay (s)/LOS		/		34.2	/	C	15.4	/	B	8.4	/	A
Intersection delay (s)/ LOS		12.5		/		B						

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOT PM 2013
Comment: 2013 TOT W/PROJ PM WITH RECHANNEL

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: MAKAALA ST
NB/SB Street: WAIAKEA WE

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	347	664	119	50	633	53	11	6	98	66	14	474
RTOR volume (veh/h)			0			0			20			50
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	TRP	L	LTP					
WB	TRP	L						
NB		R						
SB		R	R					
Green (s)	35	15	4					
Yellow + All red (s)	5	1	5					

Cycle (s): 65 | Lost time per cycle (s): 5 | Critical v/c Ratio: .498

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR				R			R
No. of lanes	1	2		1	2				1			2
Flow rate (veh/h)	377	851		54	746				85			461
Capacity (veh/h)	544	1859		408	1880				358			859
Adjusted saturation flow (veh/h)	1770	3452		1770	3492				1551			2792
v/c ratio	.693	.458		.133	.397				.237			.537
g/C ratio	.308	.538		.231	.538				.231			.308
Average back of queue (veh)	6.8	5.4		.8	4.5				1.3			4.3
Uniform delay (s)	19.8	9.2		19.8	8.8				20.3			18.7
Incremental delay (s)	3.8	.1		0	0				0			.7
Initial queue delay (s)	0	0		0	0				0			0
Delay (s)	23.6	9.3		19.8	8.8				20.3			19.4
LOS	C	A		B	A				C			B
Approach delay (s)/LOS	13.7	/	B	9.6	/	A	20.3	/	C	19.4	/	B
Intersection delay (s)/ LOS	13.6		/						B			

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOTPM 2013
Comment: 2013 TOT W/PROJ PM WITH RECHANNEL

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: MAKAALA ST
NB/SB Street: WAIAKEA CT

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)		626	48		649	103	69	22		125	44	
RTOR volume (veh/h)			5			20			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92		.92	.92	
Heavy vehicles (%)	2	2	2	2	2	2	2	2		2	2	
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2		2	2	
Extension of effective green, e (s)	2	2	2	2	2	2	2	2		2	2	
Arrival type, AT	3	3	3	3	3	3	3	3		3	3	
Approach pedestrian volume (p/h)		10			10			10			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	TRP	L						
WB	TRP	L						
NB		L	LTP					
SB		L	LT					
Green (s)	35	10	4					
Yellow + All red (s)	5	1	5					

Cycle (s): 60 | Lost time per cycle (s): 11 | Critical v/c Ratio: .407

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		TR			TR		L	T		L	T	
No. of lanes		2			2		1	1		1	1	
Flow rate (veh/h)		727			796		75	24		136	48	
Capacity (veh/h)		2040			2024		463	123		483	123	
Adjusted saturation flow (veh/h)		3497			3469		1770	1848		1770	1848	
v/c ratio		.356			.393		.162	.194		.282	.388	
g/C ratio		.583			.583		.317	.067		.317	.067	
Average back of queue (veh)		3.7			4.1		1	.4		1.8	.9	
Uniform delay (s)		6.6			6.8		14.6	26.5		15.2	26.8	
Incremental delay (s)		0			0		0	0		0	.4	
Initial queue delay (s)		0			0		0	0		0	0	
Delay (s)		6.6			6.8		14.6	26.5		15.2	27.2	
LOS		A			A		B	C		B	C	
Approach delay (s)/LOS	6.6	/	A	6.8	/	A	17.5	/	B	18.3	/	B
Intersection delay (s)/ LOS	8.4			/			A					

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CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company: AECOM
Analysis Period/Year: TOTAM 2013
Comment: 2013 TOT W/PROJ AM WITH RECHANNEL

Site Information

Jurisdiction/Date: 3/8/2009
EB/WB Street: MAKAALA ST
NB/SB Street: WAIAKEA WE

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	259	281	10	9	302	8	11	6	17	66	14	163
RTOR volume (veh/h)			0			0			0			20
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			0	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	TRP	L	LTP					
WB	TRP	L						
NB		R						
SB		R	R					
Green (s)	35	15	4					
Yellow + All red (s)	5	1	5					

Cycle (s): 65 | Lost time per cycle (s): 5 | Critical v/c Ratio: .276

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		L	TR				R			R
No. of lanes	1	2		1	2				1			2
Flow rate (veh/h)	282	316		10	337				18			155
Capacity (veh/h)	544	1893		408	1895				358			859
Adjusted saturation flow (veh/h)	1770	3515		1770	3519				1551			2792
v/c ratio	.517	.167		.024	.178				.052			.181
g/C ratio	.308	.538		.231	.538				.231			.308
Average back of queue (veh)	4.6	1.6		.1	1.8				.3			1.2
Uniform delay (s)	18.5	7.6		19.3	7.7				19.5			16.5
Incremental delay (s)	.9	0		0	0				0			0
Initial queue delay (s)	0	0		0	0				0			0
Delay (s)	19.4	7.6		19.3	7.7				19.5			16.5
LOS	B	A		B	A				B			B
Approach delay (s)/LOS	13.2	/	B	8	/	A	19.5	/	B	16.5	/	B
Intersection delay (s)/ LOS	12.1			/			B					

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AMEX 2008
Comment	2008 EXISTING AM PEAK HOUR

Site Information

Jurisdiction/Date	10/1/2008
Major Street	RAILROAD AVENUE
Minor Street	EAST PUAINAKO STREET

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		144	64	63	471		80		25			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		160	71	70	523		89		28			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	89	308	.289	1	21.3	C	18.5
	2	L	28	843	.033	<1	9.4	A	C
	3								
WB	1								
	2								
	3								
		①							
		④	70	1331	.053	<1	7.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVENUE
Minor Street	EAST PUAINAKO STREET

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		151	67	66	495		84		26			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		168	74	73	550		93		29			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	93	290	.321	1	23.2	C	20
	2	L	28	833	.034	<1	9.5	A	C
	3								
WB	1								
	2								
	3								
		①							
		④	73	1318	.056	<1	7.9	A	

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Appendix C

Unsignalized Intersection Level of Service (LOS) Calculations

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	PM AMB 2013
Comment	2013 AMBIENT PM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVENUE
Minor Street	EAST PUANAKO STREET

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		352	154	29	196		63		44			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		391	171	32	218		70		49			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	119	429	.277	1	16.6	C	15.2
	2	L	49	586	.084	<1	11.7	B	C
	3								
WB	1								
	2								
	3								
		①							
		④	32	1004	.032	<1	8.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	PM TOT 2013
Comment	2013 TOTAL PM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVENUE
Minor Street	EAST PUANAKO STREET

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		379	154	29	215		63		44			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		421	171	32	239		70		49			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	70	337	.208	1	18.5	C	15.8
	2	L	49	564	.087	<1	12	B	C
	3								
WB	1								
	2								
	3								
		①							
		④	32	979	.033	<1	8.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM TOT 2013
Comment	2013 TOTAL AM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVENUE
Minor Street	EAST PUAINAKO STREET

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		156	67	66	505		84		26			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		173	74	73	561		93		29			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	93	283	.328	1	23.8	C	20.4
	2	L	29	827	.035	<1	9.5	A	C
	3								
WB	1								
	2								
	3								
		①							
		④	73	1312	.056	<1	7.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	PMEX 2008
Comment	2008 EXISTING PM PEAK HOUR

Site Information

Jurisdiction/Date	10/1/2008
Major Street	RAILROAD AVENUE
Minor Street	EAST PUANAKO STREET

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		335	147	28	187		60		42			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		372	163	31	208		67		47			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	67	379	.177	1	16.5	C	14.4
	2	L	47	604	.078	<1	11.5	B	B
	3								
WB	1								
	2								
	3								
		①							
		④	31	1027	.03	<1	8.6	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	10/30/200
Agency or Company	M&E PAC	Major Street	RAILROAD AVENUE
Analysis Period/Year	SAT TOT 2013	Minor Street	EAST PUANAKO STREET
Comment	2013 TOTAL SATUDAY PEAK HOUR		

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		241	143	47	251		82		26			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		268	159	52	279		91		29			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	91	370	.246	1	17.9	C	16.1
	2	L	29	694	.042	<1	10.4	B	C
	3								
WB	1								
	2								
	3								
		①							
		④	52	1127	.046	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	10/14/200
Agency or Company	M&E PAC	Major Street	RAILROAD AVENUE
Analysis Period/Year	SATEX 2008	Minor Street	EAST PUANAKO STREET
Comment	2008 EXISTING SATUDAY PEAK HOUR		

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		206	136	45	215		78		25			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		229	151	50	239		87		28			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	115	466	.247	1	15.2	C	14.2
	2	L	28	733	.038	<1	10.1	B	B
	3								
WB	1								
	2								
	3								
		①							
		④	50	1173	.043	<1	8.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	10/30/200
Agency or Company	M&E PAC	Major Street	RAILROAD AVENUE
Analysis Period/Year	SAT AMB 2013	Minor Street	EAST PUANAKO STREET
Comment	2013 AMBIENT SATUDAY PEAK HOUR		

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		216	143	47	226		82		26			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		240	159	52	251		91		29			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	91	399	.228	1	16.7	C	15.2
	2	L	28	719	.039	<1	10.2	B	C
	3								
WB	1								
	2								
	3								
		①							
		④	52	1154	.045	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM TOT 2013
Comment	2013 TOTAL AM PEAK

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)	140	92	23	4	114	8	56	40	10	3	13	74
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	156	102	26	4	127	9	62	44	11	3	14	82
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	117	369	.317	1	19.2	C	19.2
	2								C
	3								
SB	1	LTR	99	731	.135	<1	10.7	B	10.7
	2								B
	3								
		①	156	1443	.108	<1	7.8	A	
		④	4	1452	.003	<1	7.5	A	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM 220 2013
Comment	2013 PM PK W/ MITIGATION

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST PUAINAKO ST
NB-SB Street	OHUOHU ST

Input Data

		EB Lane 1	EB Lane 2	WB Lane 1	WB Lane 2	NB Lane 1	NB Lane 2	SB Lane 1	SB Lane 2
Lane code (Lane 1 is curb lane)		TR	L	TR	L	LTR		LTR	
Volume (veh/h)	Left-turn		140		4	56		3	
	Through	90		114		40		13	
	Right-turn	25		8		10		74	
Peak-hour factor		.9	.9	.9	.9	.9		.9	
% Heavy vehicles		3	3	3	3	3		3	

Outputs

	EB Lane 1	EB Lane 2	WB Lane 1	WB Lane 2	NB Lane 1	NB Lane 2	SB Lane 1	SB Lane 2
Total lane flow rate (veh/h)	128	156	136	4	118		100	
Departure headway, h_d (s)	5.1	5.75	5.37	5.92	4.92		4.44	
Degree of utilization, x	.181	.249	.202	.007	.161		.123	
Move-up time, m (s)	2.3	2.3	2.3	2.3	2		2	
Service time, t_s (s)	2.8	3.45	3.07	3.62	2.92		2.44	
Capacity (veh/h)	706	620	644	602	715		783	
Delay (s) (Equation 17-55)	8.9	10.3	9.4	8.7	8.9		8.1	
Level of service (Exhibit 17-22)	A	B	A	A	A		A	
Delay (s), approach	9.7		9.4		8.9		8.1	
Level of service, approach	A		A		A		A	
Delay (s), intersection	9.2							
Level of service, intersection	A							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AMEX 2008
Comment	2008 EXISTING AM PEAK

Site Information

Jurisdiction/Date	10/1/2008
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)	100	88	22	4	109	8	53	38	10	3	12	49
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	111	98	24	4	121	9	59	42	11	3	13	54
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	112	453	.247	1	15.6	C	15.6
	2								C
	3								
SB	1	LTR	64	734	.087	<1	10.4	B	10.4
	2								B
	3								
		①	111	1449	.077	<1	7.7	A	
		④	4	1459	.003	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PEAK

Site Information

Jurisdiction/Date	10/30/2008
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)	105	92	23	4	114	8	56	40	10	3	13	51
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	117	102	26	4	127	9	62	44	11	3	14	57
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	117	434	.269	1	16.3	C	16.3
	2								C
	3								
SB	1	LTR	74	724	.102	<1	10.5	B	10.5
	2								B
	3								
		①	117	1443	.081	<1	7.7	A	
		④	4	1452	.003	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 TOTAL PM PEAK

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			LTR			LTR	
Lane 1 (curb)												
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	195	80	57	8	145	8	41	27	4	16	48	330
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	217	89	63	9	161	9	46	30	4	18	53	367
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	80	146	.547	3	56	F	56
	2								F
	3								
SB	1	LTR	438	645	.679	5	21.5	C	21.5
	2								C
	3								
		①	217	1401	.155	1	8	A	
		④	9	1422	.006	<1	7.5	A	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM 220 2013
Comment	2013 PM PK W/ MITIGATION

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST PUAINAKO ST
NB-SB Street	OHUOHU ST

Input Data

		EB		WB		NB		SB	
		Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Lane code (Lane 1 is curb lane)		TR	L	TR	L	LTR		LTR	
Volume (veh/h)	Left-turn		195		8	41		16	
	Through	80		145		27		48	
	Right-turn	57		8		4		310	
Peak-hour factor		.9	.9	.9	.9	.9		.9	
% Heavy vehicles		3	3	3	3	3		3	

Outputs

	EB		WB		NB		SB	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Total lane flow rate (veh/h)	152	217	170	9	80		414	
Departure headway, h_d (s)	5.8	6.61	6.35	6.9	5.53		4.53	
Degree of utilization, x	.245	.398	.3	.017	.123		.521	
Move-up time, m (s)	2.3	2.3	2.3	2.3	2		2	
Service time, t_s (s)	3.5	4.31	4.05	4.6	3.53		2.53	
Capacity (veh/h)	649	545	535	533	645		796	
Delay (s) (Equation 17-55)	10.4	13.6	11.7	9.7	9.3		12.4	
Level of service (Exhibit 17-22)	B	B	B	A	A		B	
Delay (s), approach	12.3		11.6		9.3		12.4	
Level of service, approach	B		B		A		B	
Delay (s), intersection	12							
Level of service, intersection	B							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PMEX 2008
Comment	2008 EXISTING PM PEAK

Site Information

Jurisdiction/Date	10/1/2008
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			LTR			LTR	
Lane 1 (curb)												
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	97	76	54	8	138	8	39	26	4	15	46	153
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	108	84	60	9	153	9	43	29	4	17	51	170
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	76	333	.228	1	19	C	19
	2								C
	3								
SB	1	LTR	238	667	.357	2	13.4	B	13.4
	2								B
	3								
		①	108	1410	.076	<1	7.8	A	
		④	9	1432	.006	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM AMB 2013
Comment	2013 AMBIENT PM PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			LTR			LTR	
Lane 1 (curb)												
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	102	80	57	8	145	8	41	27	4	16	48	161
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	113	89	63	9	161	9	46	30	4	18	53	179
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	80	311	.257	1	20.5	C	20.5
	2								C
	3								
SB	1	LTR	250	651	.384	2	13.9	B	13.9
	2								B
	3								
		①	113	1401	.081	<1	7.8	A	
		④	9	1422	.006	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA TOT 2013
Comment	2013 TOTAL SATURDAY PEAK

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	335	93	38	2	162	14	42	30	8	14	25	325
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	372	103	42	2	180	16	47	33	9	16	28	361
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	89	87	1.02	6	188.4	F	188.4
	2								F
	3								
SB	1	LTR	405	558	.726	6	26.7	D	26.7
	2								D
	3								
		①	372	1371	.271	1	8.6	A	
		④	2	1430	.002	<1	7.5	A	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SAT 220 2013
Comment	2013 SAT PK W/ MITIGATION

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST PUAINAKO ST
NB-SB Street	OHUOHU ST

Input Data

		EB		WB		NB		SB	
		Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Lane code (Lane 1 is curb lane)		TR	L	TR	L	LTR		LTR	
Volume (veh/h)	Left-turn		335	2		42		16	
	Through	93		162		30		25	
	Right-turn	38		14		4		325	
Peak-hour factor		.9	.9	.9	.9	.9		.9	
% Heavy vehicles		3	3	3	3	3		3	

Outputs

	EB		WB		NB		SB	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Total lane flow rate (veh/h)	146	372	196	2	84		407	
Departure headway, h_d (s)	5.95	6.66	6.6	7.17	5.61		4.59	
Degree of utilization, x	.24	.689	.359	.004	.132		.518	
Move-up time, m (s)	2.3	2.3	2.3	2.3	2		2	
Service time, t_s (s)	3.65	4.36	4.3	4.87	3.61		2.59	
Capacity (veh/h)	655	540	520	525	671		808	
Delay (s) (Equation 17-55)	10.5	22.8	12.9	9.9	9.5		12.4	
Level of service (Exhibit 17-22)	B	C	B	A	A		B	
Delay (s), approach	19.4		12.9		9.5		12.4	
Level of service, approach	C		B		A		B	
Delay (s), intersection	15.3							
Level of service, intersection	C							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SAEX 2008
Comment	2008 EXISTING SATURDAY PEAK

Site Information

Jurisdiction/Date	10/14/200
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	162	89	36	2	154	13	40	29	8	13	24	159
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	180	99	40	2	171	14	44	32	9	14	27	177
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	85	272	.313	1	24.1	C	24.1
	2								C
	3								
SB	1	LTR	218	649	.336	1	13.3	B	13.3
	2								B
	3								
		①	180	1383	.13	<1	8	A	
		④	2	1438	.002	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA AMB 2013
Comment	2013 AMBIENT SATURDAY PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST PUAINAKO ST
Minor Street	OHUOHU ST

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	TR	LTR	LTR
Lane 2	L	L		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	170	93	38	2	162	14	42	30	8	14	25	167
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	189	103	42	2	180	16	47	33	9	16	28	186
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LTR	89	250	.355	2	27.1	D	27.1
	2								D
	3								
SB	1	LTR	230	626	.367	2	14	B	14
	2								B
	3								
		①	189	1371	.138	<1	8	A	
		④	2	1430	.002	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM TOT 2013
Comment	2013 TOTAL AM PEAK HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		204	100	100	412		56		33			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		227	111	111	458		62		37			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	37	754	.049	<1	10	A	18.4
	2	L	62	257	.241	1	23.4	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	111	1216	.091	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PMEX 2008
Comment	2008 EXISTING PM PEAK HR

Site Information

Jurisdiction/Date	10/30/2008
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		390	146	53	184		67		57			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		433	162	59	204		74		63			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	63	558	.113	<1	12.3	B	16.4
	2	L	74	315	.235	1	19.9	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	59	976	.06	<1	8.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AMEX 2008
Comment	2008 EXISTING AM PEAK HR

Site Information

Jurisdiction/Date	10/30/2008
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		198	76	77	397		49		27			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		220	84	86	441		54		30			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	30	774	.039	<1	9.8	A	16.2
	2	L	54	297	.182	1	19.8	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	86	1251	.068	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PEAK HR

Site Information

Jurisdiction/Date	10/30/2008
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		208	80	81	417		51		28			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		231	89	90	463		57		31			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	31	761	.041	<1	9.9	A	17.3
	2	L	57	278	.205	1	21.3	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	90	1234	.073	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SAEX 2008
Comment	2008 EXISTING SATURDAY HR

Site Information

Jurisdiction/Date	10/7/2008
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		204	161	60	218		122		71			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		227	179	67	242		136		79			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	79	722	.109	<1	10.6	B	16.2
	2	L	136	385	.353	2	19.4	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	67	1148	.058	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA AMB 2013
Comment	2013 AMBIENT SATURDAY HR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		214	169	63	229		128		75			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		238	188	70	254		142		83			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	83	708	.117	<1	10.8	B	17.2
	2	L	142	366	.388	2	21	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	70	1128	.062	<1	8.4	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM AMB 2013
Comment	2013 AMBIENT PM PEAK HR

Site Information

Jurisdiction/Date	10/30/200
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		410	153	56	193		70		60			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		456	170	62	214		78		67			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	67	539	.124	<1	12.6	B	17.4
	2	L	78	296	.264	1	21.5	C	C
	3								
WB	1								
	2								
	3								
		①							
		④	62	951	.065	<1	9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 TOTAL PM PEAK HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		392	255	80	187		100		95			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		436	283	89	208		111		106			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	97	514	.189	1	13.6	B	22.2
	2	L	111	254	.437	2	29.8	D	C
	3								
WB	1								
	2								
	3								
		①							
		④	89	878	.101	<1	9.6	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM EX 2008
Comment	2008 EXISITNG AM PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		83	60	6	142		44		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		92	67	7	158		49		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	55	763	.072	<1	10.1	B	10.1
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	7	1411	.005	<1	7.6	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		87	63	6	149		46		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		97	70	7	166		51		6			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	57	752	.076	<1	10.2	B	10.2
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	7	1401	.005	<1	7.6	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA TOT 2013
Comment	2013 TOTAL SATURDAY HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	RAILROAD AVE
Minor Street	EAST MAKAALA ST

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	R	
Lane 2			L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		195	250	100	220		222		115			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		217	278	111	244		247		128			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	128	686	.187	1	11.4	B	37.9
	2	L	247	307	.806	7	51.6	F	E
	3								
WB	1								
	2								
	3								
		①							
		④	111	1064	.104	<1	8.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 AMBIENT PM PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		165	89	7	175		75		7			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		183	99	8	194		83		8			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	91	635	.143	<1	11.6	B	11.6
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	8	1270	.006	<1	7.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 PM PEAK HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	E MAKAALA ST
Minor Street	HD/NEW PROJ DRIVEWAY

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	R	R
Lane 2	LT	LT	L	L
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	280	315	89	7	365	50	75		7	30		335
PHF	.9	.9	.9	.9	.9	.9	.9		.9	.9		.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3		3	3		3
Flow rate	311	350	99	8	406	56	83		8	33		372
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	8	776	.01	<1	9.7	A	426.4
	2	L	83	52	1.592	8	466.6	F	F
	3								
SB	1	R	372	769	.484	3	14	B	17.6
	2	L	33	99	.333	1	58.5	F	C
	3								
		①	311	1089	.286	1	9.6	A	
		④	8	1101	.007	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM TOT 2013
Comment	2013 AM PEAK HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	E MAKAALA ST
Minor Street	HD/NEW PROJ DRIVEWAY

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	R	R
Lane 2	LT	LT	L	L
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	85	135	63	6	170	18	46		5	1		50
PHF	.9	.9	.9	.9	.9	.9	.9		.9	.9		.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3		3	3		3
Flow rate	94	150	70	7	189	20	51		6	1		56
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	6	919	.007	<1	8.9	A	14.3
	2	L	51	413	.124	<1	15	B	B
	3								
SB	1	R	56	927	.06	<1	9.1	A	9.2
	2	L	1	440	.002	<1	13.2	B	A
	3								
		①	94	1352	.07	<1	7.9	A	
		④	7	1339	.005	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM EX 2008
Comment	2008 EXISTING PM PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		157	85	7	167		71		7			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		174	94	8	186		79		8			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	87	650	.134	<1	11.4	B	11.4
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	8	1284	.006	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SAT TOT 2013
Comment	2013 SAT PEAK HR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	E MAKAALA ST
Minor Street	HD/NEW PROJ DRIVEWAY

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			R			R	
Lane 1 (curb)		LT			LT			L			L	
Lane 2												
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	375	415	179	7	450	50	121		3	60		380
PHF	.9	.9	.9	.9	.9	.9	.9		.9	.9		.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3		3	3		3
Flow rate	417	461	199	8	500	56	134		3	67		422
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	R	3	663	.005	<1	10.5	B	3357.1
	2	L	134	17	7.668	17	3432.1	F	F
	3								
SB	1	R	422	717	.589	4	17	C	73.4
	2	L	67	46	1.445	6	429	F	F
	3								
		①	417	1004	.415	2	11.1	B	
		④	8	917	.008	<1	9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA EX 2008
Comment	2008 EXISTING SATURDAY PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)		T			LT							
Lane 2												
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		155	171	7	209		115		3			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		172	190	8	232		128		3			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	131	577	.227	1	13.1	B	13.1
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	8	1186	.007	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA AMB 2013
Comment	2013 AMBIENT SATURDAY PK HR

Site Information

Jurisdiction/Date	10/31/200
Major Street	E. MAKAALA ST
Minor Street	HOME DEPOT DW

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)		T			LT							
Lane 2												
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		163	179	7	219		121		3			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		181	199	8	243		134		3			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	137	561	.244	1	13.5	B	13.5
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	8	1168	.007	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	AM TOT 2013
Comment	2013 TOTAL AM PEAK HOUR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)												
Lane 2		T			LT							
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	0	220	83	47	210		100		85			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		244	92	52	233		111		94			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	205	588	.349	2	14.4	B	14.4
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	52	1212	.043	<1	8.1	A	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	AM 220 2013
Comment	2013 AM PK W/3WAY STOP (220KSF)

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST MAKAALA ST
NB-SB Street	OHUOHU STREET

Input Data

		EB		WB		NB		SB	
		Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Lane code (Lane 1 is curb lane)		TR	T	T	LT	LTR			
Volume (veh/h)	Left-turn				45	99			
	Through	60	160	160	50				
	Right-turn	83				85			
Peak-hour factor		.9	.9	.9	.9	.9			
% Heavy vehicles		3	3	3	3	3			

Outputs

	EB		WB		NB		SB	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Total lane flow rate (veh/h)	159	178	178	106	204			
Departure headway, h_d (s)	4.98	5.39	5.43	5.67	4.6			
Degree of utilization, x	.22	.266	.268	.166	.261			
Move-up time, m (s)	2.3	2.3	2.3	2.3	2			
Service time, t_s (s)	2.68	3.09	3.13	3.37	2.6			
Capacity (veh/h)	724	665	655	636	801			
Delay (s) (Equation 17-55)	9.1	10	10.1	9.5	9.2			
Level of service (Exhibit 17-22)	A	A	B	A	A			
Delay (s), approach	9.6		9.9		9.2			
Level of service, approach	A		A		A			
Delay (s), intersection	9.6							
Level of service, intersection	A							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	EXAM 2008
Comment	2008 EXISTING AM PEAK HOUR

Site Information

Jurisdiction/Date	10/1/2008
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)												
Lane 2		T			LT							
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		115	79	23	156		94		48			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		128	88	26	173		104		53			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	157	716	.219	1	11.4	B	11.4
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	26	1344	.019	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)												
Lane 2		T			LT							
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		121	83	24	164		99		50			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		134	92	27	182		110		56			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	166	702	.236	1	11.7	B	11.7
	2								B
	3								
SB	1								
	2								
	3								
		①							
		④	27	1332	.02	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 TOTAL PM PEAK HOUR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)		T			LT							
Lane 2												
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	0	550	163	225	595		151		150			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		611	181	250	661		168		167			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	335	131	2.554	30	774.2	F	774.2
	2								F
	3								
SB	1								
	2								
	3								
		①							
		④	250	818	.306	1	11.3	B	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	PM 220 2013
Comment	2013 PM PK W/3WY STOP (220 KSF)

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST MAKAALA ST
NB-SB Street	OHUOHU STREET

Input Data

		EB		WB		NB		SB	
		Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Lane code (Lane 1 is curb lane)		TR	T	T	LT	LTR			
Volume (veh/h)	Left-turn				225	151			
	Through	170	380	405	190				
	Right-turn	163				150			
Peak-hour factor		.9	.9	.9	.9	.9			
% Heavy vehicles		3	3	3	3	3			

Outputs

	EB		WB		NB		SB	
	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2	Lane 1	Lane 2
Total lane flow rate (veh/h)	370	422	450	464	334			
Departure headway, h_d (s)	6.16	6.51	6.32	6.59	4.14			
Degree of utilization, x	.633	.764	.79	.844	.385			
Move-up time, m (s)	2.3	2.3	2.3	2.3	2			
Service time, t_s (s)	3.86	4.21	4.02	4.29	2.14			
Capacity (veh/h)	584	556	574	551	1125			
Delay (s) (Equation 17-55)	18.9	27.2	28.7	35.4	9.7			
Level of service (Exhibit 17-22)	C	D	D	E	A			
Delay (s), approach	23.3		32.1		9.7			
Level of service, approach	C		D		A			
Delay (s), intersection	25							
Level of service, intersection	C							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	EXPM 2008
Comment	2008 EXISTING PM PEAK HOUR

Site Information

Jurisdiction/Date	10/1/2008
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)		T			LT							
Lane 2												
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		202	155	51	229		144		54			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		224	172	57	254		160		60			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	220	501	.439	2	17.7	C	17.7
	2								C
	3								
SB	1								
	2								
	3								
		①							
		④	57	1151	.049	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM AMB 2013
Comment	2013 AMBIENT PM PEAK HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			T			LR				
Lane 1 (curb)		T			LT							
Lane 2												
Lane 3												
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		212	163	54	240		151		57			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		236	181	60	267		168		63			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	231	482	.48	3	19.2	C	19.2
	2								C
	3								
SB	1								
	2								
	3								
		①							
		④	60	1132	.053	<1	8.4	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA TOT 2013
Comment	2013 TOTAL SATURDAY HOUR

Site Information

Jurisdiction/Date	2/15/2009
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)		685	164	235	715		218		250			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		761	182	261	794		242		278			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	520	91	5.699	57	2205.6	F	2205.6
	2								F
	3								
SB	1								
	2								
	3								
		①							
		④	261	717	.364	2	12.9	B	

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CHAPTER 17 - AWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E P AC
Analysis Period/Year	SAT 220 2013
Comment	2013 SAT PK W/ 3 WAY STOP

Site Information

Jurisdiction/Date	2/25/2009
EB-WB Street	EAST MAKAALA ST
NB-SB Street	OHUOHU STREET

Input Data

		EB Lane 1	EB Lane 2	WB Lane 1	WB Lane 2	NB Lane 1	NB Lane 2	SB Lane 1	SB Lane 2
Lane code (Lane 1 is curb lane)		TR	T	T	LT	LTR			
Volume (veh/h)	Left-turn				235	250			
	Through	245	440	485	230				
	Right-turn	164				250			
Peak-hour factor		.9	.9	.9	.9	.9			
% Heavy vehicles		3	3	3	3	3			

Outputs

	EB Lane 1	EB Lane 2	WB Lane 1	WB Lane 2	NB Lane 1	NB Lane 2	SB Lane 1	SB Lane 2
Total lane flow rate (veh/h)	454	489	539	517	556			
Departure headway, h_d (s)	6.93	7.22	7.05	7.31	3.77			
Degree of utilization, x	.875	.98	1.056	1.05	.582			
Move-up time, m (s)	2.3	2.3	2.3	2.3	2			
Service time, t_s (s)	4.63	4.92	4.75	5.01	1.77			
Capacity (veh/h)	533	512	515	496	1125			
Delay (s) (Equation 17-55)	40.8	62	81.6	81	11.9			
Level of service (Exhibit 17-22)	E	F	F	F	B			
Delay (s), approach	51.8		81.3		11.9			
Level of service, approach	F		F		B			
Delay (s), intersection	55.3							
Level of service, intersection	F							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	EXSA 2008
Comment	2008 EXISTING SATURDAY HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)	0	217	156	72	250		208		81			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		241	173	80	278		231		90			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	321	450	.714	6	30.6	D	30.6
	2								D
	3								
SB	1								
	2								
	3								
		①							
		④	80	1134	.071	<1	8.4	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA AMB 2013
Comment	2013 AMBIENT SATURDAY HOUR

Site Information

Jurisdiction/Date	10/30/200
Major Street	EAST MAKAALA ST
Minor Street	OHUOHU STREET

Input Data

	EB	WB	NB	SB
Lane Configuration				
Lane 1 (curb)	TR	T	LR	
Lane 2	T	LT		
Lane 3				

Movement	EB 1 (LT)	EB 2 (TH)	EB 3 (RT)	WB 4 (LT)	WB 5 (TH)	WB 6 (RT)	NB 7 (LT)	NB 8 (TH)	NB 9 (RT)	SB 10 (LT)	SB 11 (TH)	SB 12 (RT)
Volume (veh/h)		228	164	76	262		218		85			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		253	182	84	291		242		94			
Flare storage (# of vehs)									0			
Median storage (# of vehs)								0				

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	LR	336	429	.784	7	37.7	E	37.7
	2								E
	3								
SB	1								
	2								
	3								
		①							
		④	84	1113	.076	<1	8.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	TOT AM 2013
Comment	2013 TOTAL W/PROJ AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			TR			R		
Lane 2	T			T			L			LT		
Lane 3	L			L								
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	114	294	15	3	332	84	5	2	7	42	12	51
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	127	327	17	3	369	93	6	2	8	47	13	57
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	10	506	.02	<1	12.3	B	15.7
	2	L	6	225	.027	<1	21.4	C	C
	3								
SB	1	R	70	510	.137	<1	13.2	B	17.2
	2	LT	41	229	.179	1	24.1	C	C
	3								
		①	127	1088	.116	<1	8.7	A	
		④	3	1205	.003	<1	8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	EX PM 2008
Comment	2008 EXIST PM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			TR			R		
Lane 2	T			T			L			LT		
Lane 3	L			L								
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	127	307	46	7	292	80	29	8	27	59	25	151
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	141	341	51	8	324	89	32	9	30	66	28	168
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	39	459	.085	<1	13.6	B	22.1
	2	L	32	162	.197	1	32.5	D	C
	3								
SB	1	R	196	550	.356	2	15.1	C	18.7
	2	LT	66	214	.309	1	29.2	D	C
	3								
		①	141	1135	.124	<1	8.6	A	
		④	8	1156	.007	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	EX AM 2008
Comment	2008 EXIST AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			TR			R		
Lane 2	T			T			L			LT		
Lane 3	L			L								
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	109	196	14	3	227	80	5	2	2	35	11	49
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	121	218	16	3	252	89	6	2	2	39	12	54
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	4	424	.009	<1	13.6	B	15.4
	2	L	6	316	.019	<1	16.6	C	C
	3								
SB	1	R	66	625	.106	<1	11.4	B	13.8
	2	LT	39	319	.122	<1	17.9	C	B
	3								
		①	121	1207	.1	<1	8.3	A	
		④	3	1324	.003	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	AMB AM 2013
Comment	2013 AMBIENT AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			TR			R		
Lane 2	T			T			L			LT		
Lane 3	L			L								
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	114	206	15	3	238	84	5	2	2	37	12	51
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	127	229	17	3	264	93	6	2	2	41	13	57
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	4	404	.01	<1	14	B	16
	2	L	6	297	.02	<1	17.4	C	C
	3								
SB	1	R	70	603	.116	<1	11.8	B	14.4
	2	LT	41	301	.136	<1	18.8	C	B
	3								
		①	127	1190	.106	<1	8.4	A	
		④	3	1310	.003	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	EX AM 2008
Comment	2008 EXIST AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		TR			TR			TR			R	
Lane 2		T			T			L			LT	
Lane 3		L			L							
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	138	301	14	6	241	8	6	4	5	18	2	107
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	153	334	16	7	268	9	7	4	6	20	2	119
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	10	405	.025	<1	14.1	B	17.5
	2	L	7	214	.033	<1	22.4	C	C
	3								
SB	1	R	121	841	.144	1	10	A	11.4
	2	LT	20	259	.077	<1	20.1	C	B
	3								
		①	153	1276	.12	<1	8.2	A	
		④	7	1198	.006	<1	8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	AMB AM 2013
Comment	2013 AMBIENT AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		TR			TR			TR			R	
Lane 2		T			T			L			LT	
Lane 3		L			L							
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	145	316	10	6	253	8	6	4	5	19	2	112
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	161	351	11	7	281	9	7	4	6	21	2	124
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	10	385	.026	<1	14.6	B	18.4
	2	L	7	198	.035	<1	23.8	C	C
	3								
SB	1	R	126	832	.151	1	10.1	B	11.7
	2	LT	21	241	.087	<1	21.3	C	B
	3								
		①	161	1261	.128	<1	8.3	A	
		④	7	1186	.006	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	AMB PM 2013
Comment	2013 AMBIENT PM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		TR			TR			TR			R	
Lane 2		T			T			L			LT	
Lane 3		L			L							
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	133	322	48	7	307	84	30	8	28	62	26	159
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	148	358	53	8	341	93	33	9	31	69	29	177
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	40	440	.091	<1	14	B	24.3
	2	L	33	146	.227	1	36.8	E	C
	3								
SB	1	R	206	530	.389	2	16.1	C	20.2
	2	LT	69	197	.35	1	32.7	D	C
	3								
		①	148	1115	.133	<1	8.7	A	
		④	8	1137	.007	<1	8.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	TOT PM 2013
Comment	2013 TOTAL W/PROJ PM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART E DRIVEWAY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		TR			TR			TR			R	
Lane 2		T			T			L			LT	
Lane 3		L			L							
	EB			WB			NB			SB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	133	624	48	18	631	103	30	8	40	87	26	159
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	148	693	53	20	701	114	33	9	44	97	29	177
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	53	229	.231	1	25.3	D	131
	2	L	33	35	.936	3	300.8	F	F
	3								
SB	1	R	206	259	.794	6	56.8	F	170.5
	2	LT	97	63	1.53	8	411.8	F	F
	3								
		①	148	801	.184	1	10.5	B	
		④	20	851	.024	<1	9.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	AMB PM 2013
Comment	2013 AMBIENT PM

Site Information

Jurisdiction/Date	2/24/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			TR			R	
Lane 1 (curb)		T			T			L			LT	
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	234	520	119	21	462	35	39	14	34	27	18	315
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	260	578	132	23	513	39	43	16	38	30	20	350
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	54	164	.328	1	37.2	E	312.7
	2	L	43	26	1.68	5	658.7	F	F
	3								
SB	1	R	370	437	.847	8	44.5	E	49.8
	2	LT	30	60	.504	2	115.7	F	E
	3								
		①	260	1007	.258	1	9.8	A	
		④	23	878	.027	<1	9.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	TOT PM 2013
Comment	2013 TOTAL W/PROJECT PM

Site Information

Jurisdiction/Date	2/24/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			TR			R	
Lane 1 (curb)		T			T			L			LT	
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	234	797	119	32	756	53	39	14	48	38	18	315
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	260	886	132	36	840	59	43	16	53	42	20	350
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	54	58	.925	4	211	F	211
	2	L	43			<1			F
	3								
SB	1	R	370	211	1.754	25	397.3	F	518.4
	2	LT	30	8	3.554	5	2012	F	F
	3								
		①	260	745	.349	2	12.4	B	
		④	36	671	.053	<1	10.7	B	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	TOT AM 2013
Comment	2013 TOTAL W/PROJ AM

Site Information

Jurisdiction/Date	3/8/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			TR			R	
Lane 1 (curb)		T			T			L			LT	
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	145	395	10	6	347	8	6	4	10	24	2	112
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	161	439	11	7	386	9	7	4	11	27	2	124
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	15	385	.039	<1	14.7	B	19.5
	2	L	7	152	.046	<1	29.8	D	C
	3								
SB	1	R	126	759	.166	1	10.7	B	13
	2	LT	21	184	.114	<1	27.1	D	B
	3								
		①	161	1154	.14	<1	8.6	A	
		④	7	1100	.006	<1	8.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	AECOM
Analysis Period/Year	EX PM 2008
Comment	2008 EXIST PM

Site Information

Jurisdiction/Date	2/24/2009
Major Street	MAKAALA ST
Minor Street	WALMART W DRIVEWAY

Input Data

	EB			WB			NB			SB		
Lane Configuration		TR			TR			TR			R	
Lane 1 (curb)		T			T			L			LT	
Lane 2		L			L							
Lane 3												
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	223	495	113	20	440	33	37	13	32	26	17	300
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	248	550	126	22	489	37	41	14	36	29	19	333
Flare storage (# of vehs)									0			0
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
NB	1	TR	46	183	.252	1	31.2	D	210.6
	2	L	41	33	1.225	4	411.7	F	F
	3								
SB	1	R	352	470	.748	6	32.1	D	36.2
	2	LT	29	72	.405	2	86	F	E
	3								
		①	248	1030	.24	1	9.6	A	
		④	22	905	.025	<1	9.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM TOT 2013
Comment	2013 TOTAL AM PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	235	704			1478	27				1		120
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	261	782			1642	30				1		133
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	133	315	.422	2	24.5	C	29.1
	2	L	1	7	.154	<1	641.4	F	D
	3								
		①	261	375	.696	5	33.8	D	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	EX PM 2008
Comment	2008 EXISTING PM PEAK

Site Information

Jurisdiction/Date	10/16/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	334	1506			922	36				6		218
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	371	1673			1024	40				7		242
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	242	504	.48	3	18.6	C	40.5
	2	L	7	8	.834	2	799.9	F	E
	3								
		①	371	644	.576	4	17.9	C	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	EX AM 2008
Comment	2008 EXISTING AM PEAK

Site Information

Jurisdiction/Date	10/16/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	205	653			1405	25				1		112
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	228	726			1561	28				1		124
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	124	336	.369	2	21.9	C	24.3
	2	L	1	12	.081	<1	320.5	F	C
	3								
		①	228	405	.563	3	24.8	C	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	AM AMB 2013
Comment	2013 AMBIENT AM PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	215	686			1473	27				1		118
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	239	762			1637	30				1		131
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	131	317	.413	2	24.1	C	27.5
	2	L	1	9	.116	<1	471.3	F	D
	3								
		①	239	377	.633	4	29.6	D	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	EX SA 2008
Comment	2008 EXISTING SATURDAY PEAK

Site Information

Jurisdiction/Date	10/7/2008
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	530	937			1088	178				28		460
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	589	1041			1209	198				31		511
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	511	439	1.165	19	125.7	F	125.7
	2	L	31			<1			F
	3								
		①	589	476	1.237	24	149.9	F	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	SA AMB 2013
Comment	2013 AMBIENT SATURDAY PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	557	984			1142	178				29		483
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	619	1093			1269	198				32		537
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	537	419	1.281	23	171.5	F	171.5
	2	L	32			<1			F
	3								
		①	619	451	1.372	29	205.7	F	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM AMB 2008
Comment	2013 AMBIENT PM PEAK

Site Information

Jurisdiction/Date	10/30/200
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	351	1581			968	38				6		229
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	390	1757			1076	42				7		254
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	254	485	.524	3	20.3	C	53
	2	L	7	6	1.194	2	1238.4	F	F
	3								
		①	390	615	.634	4	20.5	C	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	M&E PAC
Analysis Period/Year	PM TOT 2013
Comment	2013 TOTAL PM PEAK

Site Information

Jurisdiction/Date	2/15/2009
Major Street	POHAKU ST
Minor Street	KANOELEHUA AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	440	1665			1040	38				6		253
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	489	1850			1156	42				7		281
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	281	457	.615	4	24.7	C	172.1
	2	L	7	1	5.036	2	6090.3	F	F
	3								
		①	489	573	.853	9	37.5	E	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	2/15/2009
Agency or Company	M&E PAC	Major Street	POHAKU ST
Analysis Period/Year	SA TOT 2013	Minor Street	KANOELEHUA AVE
Comment	2013 TOTAL SATURDAY PEAK		

Input Data

	SB	NB	EB	WB
Lane Configuration				
Lane 1 (curb)	T	R		R
Lane 2	T	T		L
Lane 3	L	T		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	635	1145			1238	187				29		560
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	706	1272			1376	208				32		622
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	622	387	1.609	36	311.1	F	311.1
	2	L	32			<1			F
	3								
		①	706	407	1.736	43	364.6	F	
		④							

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APPENDIX D. PHASE I ENVIRONMENTAL REPORT

DHHL EAST MAKA'ALA MIXED USE DEVELOPMENT

TMK (3) 2-2-47: 072
Hilo, Hawai'i

Phase I Environmental Site Assessment

Prepared for
Department of Hawaiian Home Lands
East Maka'ala, Property
Hilo, Hawai'i

Prepared by
Group 70 International, Inc.
Architecture • Planning & Environmental Services • Interior Design • Assets Management
Honolulu, Hawai'i

December 2008

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1.0 INTRODUCTION

The Department of Hawaiian Home Lands (DHHL) retained Group 70 International to conduct a Phase I Environmental Site Assessment (ESA) of the DHHL East Maka'ala Property (the "project site") located on the parcel of land identified as Tax Map Key (TMK) (3) 2-2-047:072 in Hilo, Hawai'i on the Island of Hawai'i. The Phase I ESA process includes a historical review, regulatory agency and document review, site reconnaissance, interviews and identification of environmental concerns. The purpose of the Phase I ESA was to provide an independent, professional opinion regarding recognized environmental conditions, as defined by the American Society for Testing and Materials (ASTM), associated with the project site.

2.0 FINDINGS

Environmental Data Resources, Inc. (EDR) was subcontracted by Group 70 to conduct a search of environmental databases pertaining to sites near the subject property. Records for the subject property as well as neighboring properties up to 1 mile around the property were searched by EDR and reviewed to determine if environmental impacts had previously or currently exist. The records listed in *Table 1-1* have been reviewed. The results of the EDR report indicate there are 17 environmental sites identified within, or near, the 1-mile search area around the property. The complete EDR report is presented in *Appendix A*.

Group 70 also searched local, state, and county records. Additional searched records are summarized in *Table 1-2*. Records searched and reviewed for this ESA include those from the federal government, State of Hawai'i Department of Health (DOH), and the County of Hawai'i.

Table 1-1. EDR Records Search

Federal ASTM Standard:	State ASTM Standard:	Federal ASTM Supplemental:	State ASTM Supplemental:
• NPL • Proposed NPL • CERCLIS • CERCLIS-NFRAP • CORRACTS • RCRA-TSD • RCRA-LQG • RCRA-SQG • ERNS	• SHWS • SWF/LF • LUST • UST • VCP	• CONSENT • ROD • Delisted NPL • FINDS • HMIRS • MLTS • MINES • PADS • DOD • FUDS • RAATS • TRIS • TSCA • SSTS • FTTS	• SPILLS • DRYCLEANERS • BROWNFIELDS • AIRS

NPL	national priority list
CERCLIS	comprehensive environmental response, compensation, and liability information system

NFRAP	no further remedial action planned
CORRACTS	corrective action reports
RCRA	resource conservation and recovery act
TDS	treatment, storage and disposal facility
LQG	large quantity generator
SQG	small quantity generator
ERNS	emergency response notification system
SHWS	Solid and Hazardous Waste Sites
SWF	solid waste facility
LUST	leaking underground storage tank
UST	underground storage tank
VCP	voluntary response program sites
LF	permitted landfill in the State of Hawaii
CONSENT	superfund consent decrees
ROD	record of decision
FINDS	Facility Index System/Facility Identification Initiative Program Summary Report
HMIRS	hazardous material information reporting system
MLTS	material licensing tracking system
PADS	polychlorinated biphenyl activity database system
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
RAATS	resource conservation and recovery act (RCRA) administrative tracking system
TRIS	toxic chemical release inventory system
TSCA	toxic control act
SSTS	Section 7 Tracking Systems
FTTS	Federal Insecticide, Fungicide, & Rodenticide Act/TSCA Tracking System
SPILLS	spill release notifications
DRYCLEANERS	Permitted drycleaner facility listing
BROWNFIELDS	Brownfield Sites
AIRS	List of permitted facilities

Table 1-2 . Additional Reviewed Records

Records Reviewed
State of Hawai'i Department of Health
County of Hawai'i Real Property Tax Division Records
Historic Sanborn Fire Insurance Maps
Historical Topographic Maps

The review of the regulatory database search identified five environmental sites within 1/8 mile -1/4 mile from the project site. The five properties identified are as follows:

- M. Sonomura Contracting Co., Inc 100 Kukila Street, Hilo, Hawai'i
- Hilo Wood Treating, Inc. 66 Kukila Street, Hilo, Hawai'i
- Akana Petroleum, Inc. 50 Kukila Street, Hilo, Hawai'i
- Divaco Cooperative 30 Kukila Street, Hilo, Hawai'i
- Hilo Waterhouse 95 Pohaki Street, Hilo Hawai'i

In response to these listings by the database search report, Group 70 requested and reviewed regulatory files for the properties identified above at the DOH Solid and Hazardous Waste Branch (SHWB) and Hazard Evaluation Emergency Response Office (HEER). Based on review of records pertaining to the listed properties on the regulatory database search, the Hilo Wood Treating Company property, which is the property located directly north of the subject property, was marked as the property of concern that may have impacted the natural environment of the project site. Refer to Appendix B for Government Records Reviewed.

Based on activities that historically had taken place at the Hilo Wood Treating facility; records reviewed showed that sampling data collected identified Arsenic, Chromium, and Copper, and Hexavalent Chromium in the soil. A statement of work proposed by Levine–Fricke recommended additional sample collections to determine and evaluate the extent of vertical and horizontal contamination of Chromium, Copper and Arsenic above background levels at the Hilo Wood Treating Facility in order to develop an effective remediation plan. Additional Documentation reviewed at DOH requested that Hilo Wood Treating Company inform adjacent property owners that past releases from the facility may have contaminated their property. The project site is the adjacent property to the south of the Hilo Wood Treating facility. Dated documentation reviewed at DOH ended in the late 90's and no other documentation on additional actions taken at the Hilo Wood Treating facility was available at DOH.

A site reconnaissance took place on September 15, 2008 to visually observe the property and a meeting was conducted between the current occupant of the subject property to obtain information on past or current uses of the subject property and adjoining properties. The actions taken place were conducted to investigate if any recognized environmental conditions may be associated with the project site.

Communication with the current tenant on the project site provided information that Akana Petroleum had hired Will Chee Planning and Environmental to conduct a Phase I ESA in 2004/2005 on the subject property, and that based on findings in the Phase I ESA a Phase II ESA was recommended and conducted. Mr. Akana also stated that the Lawyers of the parent company to Hawaiian Petroleum (Salchex Alaska) have the Phase II ESA document and that it had not been released to Mr. Akana.

The *Phase I Environmental Site Assessment, Akana Petroleum, Inc. Tax Map Key (3) 2-2-47:59, Hilo, Island of Hawai'i, Hawai'i, January 2005* prepared by Will Chee- Planning and Environmental, was reviewed during a site visit conducted by Group 70 and a copy of the document was provided to Group 70 by DHHL. The conclusion of the Phase I ESA stated that Hilo Wood

Treating had complied with the EPA's enforcement action and covered the arsenic contamination areas with an asphaltic concrete cap, however the arsenic contamination still exists under the cap. There was some indication of soil sampling conducted by Hilo Wood Treating that the project site had been impacted from operations at the Hilo Wood Treating facility. Will Chee recommended an additional round of independent sampling be conducted on the property between Hilo Wood Treating and the project site to determine the full extent of surface soil contamination and that the samples should be analyzed for total Arsenic, Chromium, and Copper. Based on analytical results from the soil sampling event, a course of action should be established to remediate the site, perform a Human Health and Ecological Risk Assessment or both.

Following review of the Phase I ESA while at the project site, the north boundary of the project site was observed with great detail. No stressed vegetation, visual, or olfactory signs of contamination where present. The Hilo Wood Treating facility was completely paved up to the property boundary adjacent to the Project Site. The Hilo Wood Treating Site appeared to be down gradient from the project site, however during times of heavy storms it is assumed that elevations on the project site will experience pooling water in the area of the northern project site boundary.

Ten AST's were observed on the project site within secondary containment comprised of concrete masonry units (CMU). A crack was observed on the northwest section of the CMU secondary containment wall. No surface staining or pooling of liquids was observed within or exterior to the secondary containment area. As Akana Petroleum is a company that sells Chevron petroleum products, minor staining was observed on the paved surfaces of the site, however it was not identified as a recognized environmental condition, but as routine operational results.

Based on communication with Mr. Akana of Akana Petroleum, a Phase II ESA was conducted on the project site by Marina L. Talisayan, Project Geologist with the company Bureau Veritas North America, Inc., located in Kailua, Hawai'i. No documentation was available to review regarding the completed Phase II ESA and findings of additional sampling that was believed to have taken place during the Phase II ESA.

Title records and property tax information was searched and reviewed at the County of Hawaii Real Property Tax Office. The records searched did not indicate the presence of improvements, structures, value reduction due to environmental issues, or use limitations or restrictions due to environmental issues. Copies of the records reviewed are presented in Appendix C.

The information gathered during the Phase I ESA process was presented to DHHL and is provided in Appendix D. Due to a Phase I ESA already being conducted on the project site, further Phase I ESA work by Group 70 was terminated by DHHL after a copy of the existing Phase I ESA Report was acquired by DHHL.

3.0 CONCLUSION

The following summarizes the independent conclusions representing Group 70 International's best professional judgment based on information and data available to us during the performance of this assignment. Factual information regarding operational conditions and data provided by the client, owner, or their representatives has been assumed to be correct and complete. The conclusions presented are based on the conditions that existed at the time of the assessment.

It is Group 70's opinion based on review of environmental databases, historical maps, regulatory review, review of the completed Phase I ESA, and communication with the current tenant, that a recognized environmental condition exists on the north property boundary of the project site. (See Figure DHHL East Maka'ala Phase 1 Impact Area) Group 70 recommends that the Phase II ESA Document and findings be obtained by the future developer of the property to identify if the lateral and horizontal extent of contamination has migrated on to the project site.

4.0 REFERENCES

Environmental Data Resources, Inc. (EDR). 2008. The EDR Radius Map Report with GeoCheck, DHHL East Makaala, Makaala Street, Hilo, Hawaii 96720. Inquiry number 2300100.2s. August.

Will Chee Planning and Environmental. 2005. Phase I Environmental Site Assessment, Akana Petroleum, Inc. Tax Map Key (3) 2-2-47:59, Hilo, Island of Hawaii, Hawaii. January.

5.0 QUALIFICATIONS AND SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

Mr. Georga Atta, AICP, Principal Planner
Masters in City & Regional Planning- Harvard University
Certified Environmental Inspector – Environmental Assessment Association
Years of Experience: 28 years of professional experience

Ms. Dricka Brown, Staff Environmental Scientist/Sustainable Development Researcher
BA, Environmental Studies, University of California at Santa Barbara, 2000
Years of Experience: 5 years of professional experience

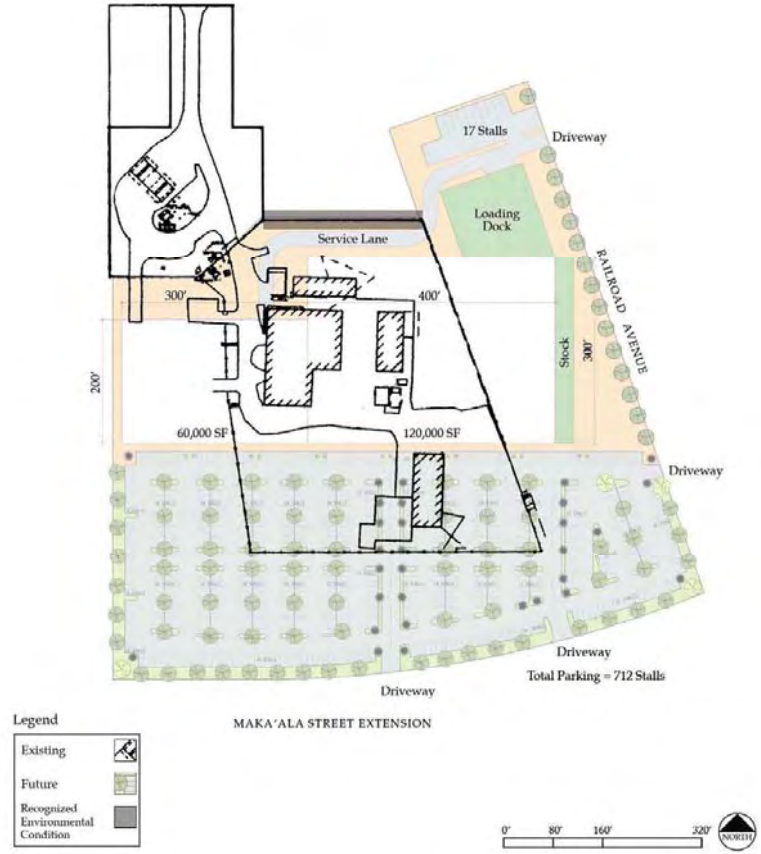

Figure 1. Phase I Impact Area

DHHL East Makaala
Makaala Street
Hilo, HI 96720

Inquiry Number: 2300100.2s
August 21, 2008

The EDR Radius Map™ Report with GeoCheck®

APPENDIX A. EDR REPORT

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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EXECUTIVE SUMMARY

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 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

MAKAALA STREET
HILO, HI 96720

COORDINATES

Latitude (North):	19.700290 - 19° 42' 1.0"
Longitude (West):	155.059540 - 155° 3' 34.3"
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	284117.1
UTM Y (Meters):	2179494.5
Elevation:	77 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	19155-F1 HILO, HI
Most Recent Revision:	Not reported

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:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Transporters, Storage and Disposal
RCRA-SQG	RCRA - Small Quantity Generators
RCRA-NonGen	RCRA - Non Generators

US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
ODI	Open Dump Inventory
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

SWF/LF	Permitted Landfills in the State of Hawaii
SPILLS	Release Notifications
VCP	Voluntary Response Program Sites
DRYCLEANERS	Permitted Drycleaner Facility Listing
BROWNFIELDS	Brownfields Sites
AIRS	List of Permitted Facilities

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

EXECUTIVE SUMMARY

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.

FEDERAL RECORDS

CERC-NFRAP: Archived sites are sites that have been removed and archived from the inventory of CERCLIS 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 this 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. This 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 a potential NPL site.

A review of the CERC-NFRAP list, as provided by EDR, and dated 12/03/2007 has revealed that there is 1 CERC-NFRAP site within approximately 0.5 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
HAWAII PEST CONTROL	56A WIWOOLE STREET	1/4 - 1/2 NW	E16	24

RCRA-LQG: 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.

A review of the RCRA-LQG list, as provided by EDR, and dated 05/12/2008 has revealed that there is 1 RCRA-LQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
HILO WOOD TREATING, INC.	***66 KUKILA ST.***	***1/8 - 1/4 NW***	***B4***	***8***

RCRA-CESQG: 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.

A review of the RCRA-CESQG list, as provided by EDR, and dated 05/12/2008 has revealed that there are 2 RCRA-CESQG sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
M SONOMURA CONTRACTING CO INC	***100 KUKILA ST***	***1/8 - 1/4 NNW***	***A2***	***6***

Lower Elevation	Address	Dist / Dir	Map ID	Page
HILO WAREHOUSE	***95 POHAKU ST***	***1/8 - 1/4 NW***	***C8***	***14***

STATE AND LOCAL RECORDS

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 04/04/2008 has revealed that there are 8 SHWS sites within approximately 1 mile of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
HILO WOOD TREATING, INC.	66 KUKILA ST	1/8 - 1/4 NW	B3	8
HAWAII PEST CONTROL	***56 WIWOOLE ST***	***1/4 - 1/2 NW***	***E15***	***23***
HILO MECHANICAL, INC	***50 HOLOMUA ST***	***1/2 - 1 NW***	***19***	***25***
HILO RUBBISH DUMP	***LEILANI ST***	***1/2 - 1 NNE***	***20***	***26***
STATIONERS CORPORATION OF HAWA	***708 KANOELEHUA AVE***	***1/2 - 1 NNW***	***21***	***27***
HILO SODA WORKS	***270 E KAWILI ST***	***1/2 - 1 WNW***	***22***	***28***
USDA FOREST SERVICE PSW EXPERI	***1643 KILAUEA AVE***	***1/2 - 1 WNW***	***23***	***29***
HELCO PIPELINE RELEASE HUALANI	KANOELEHUA AVE / HUAL	1/2 - 1 NNW	24	30

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 06/30/2008 has revealed that there are 8 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
SEARS ROEBUCK & COMPANY	***111 E PUAINAKO ST***	***1/4 - 1/2 SSW***	***D11***	***20***
Facility Status: Site Cleanup Completed (NFA)				
PRINCE KUHIO PLAZA	***111 E PUAINAKO ST***	***1/4 - 1/2 SSW***	***D12***	***21***
Facility Status: Site Cleanup Completed (NFA)				

Lower Elevation	Address	Dist / Dir	Map ID	Page
HILO WAREHOUSE	***95 POHAKU ST***	***1/8 - 1/4 NW***	***C8***	***14***
Facility Status: Site Cleanup Completed (NFA)				
KANOELEHUA OPERATIONS CENTER	***54 HALEKAUILA ST***	***1/4 - 1/2 NW***	***10***	***17***
Facility Status: Site Cleanup Completed (NFA)				
CHIKA NAKANO REPAIR SHOP, INC.	***90 POOKELA ST***	***1/4 - 1/2 WNW***	***13***	***22***
Facility Status: Site Cleanup Completed (NFA)				
TOM OKANO ENTERPRISES, INC	***202 HOLOMUA ST***	***1/4 - 1/2 W***	***14***	***23***
Facility Status: Site Cleanup Completed (NFA)				
BIG ISLAND VEHICLE CENTER	***811 KANOELEHUA AVE***	***1/4 - 1/2 NW***	***17***	***25***
Facility Status: Site Cleanup Completed (NFA)				
COUNTY OF HAWAII - SHULTZ SIDI	***630 E LANIKAULA ST***	***1/4 - 1/2 NNW***	***18***	***25***
Facility Status: Site Cleanup Completed (NFA)				

EXECUTIVE SUMMARY

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health's Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 06/30/2008 has revealed that there are 5 UST sites within approximately 0.25 miles of the target property.

Lower Elevation	Address	Dist / Dir	Map ID	Page
M. SONOMURA CONTRACTING CO, IN	100 KUKILA ST	1/8 - 1/4 NNW	A1	6
HILO WOOD TREATING INC.	66 KUKILA ST	1/8 - 1/4 NW	B5	13
AKANA PETROLEUM INC.	50 KUKILA ST	1/8 - 1/4 NW	B6	13
DIVACO COOPERATIVE	30 KUKILA ST	1/8 - 1/4 NW	7	14
HILO WAREHOUSE	95 POHAKU ST	1/8 - 1/4 NW	C9	16

Voluntary Remediation Program and Brownfields sites with institutional controls in place.

A review of the INST CONTROL list, as provided by EDR, and dated 04/04/2008 has revealed that there is 1 INST CONTROL site within approximately 0.5 miles of the target property.

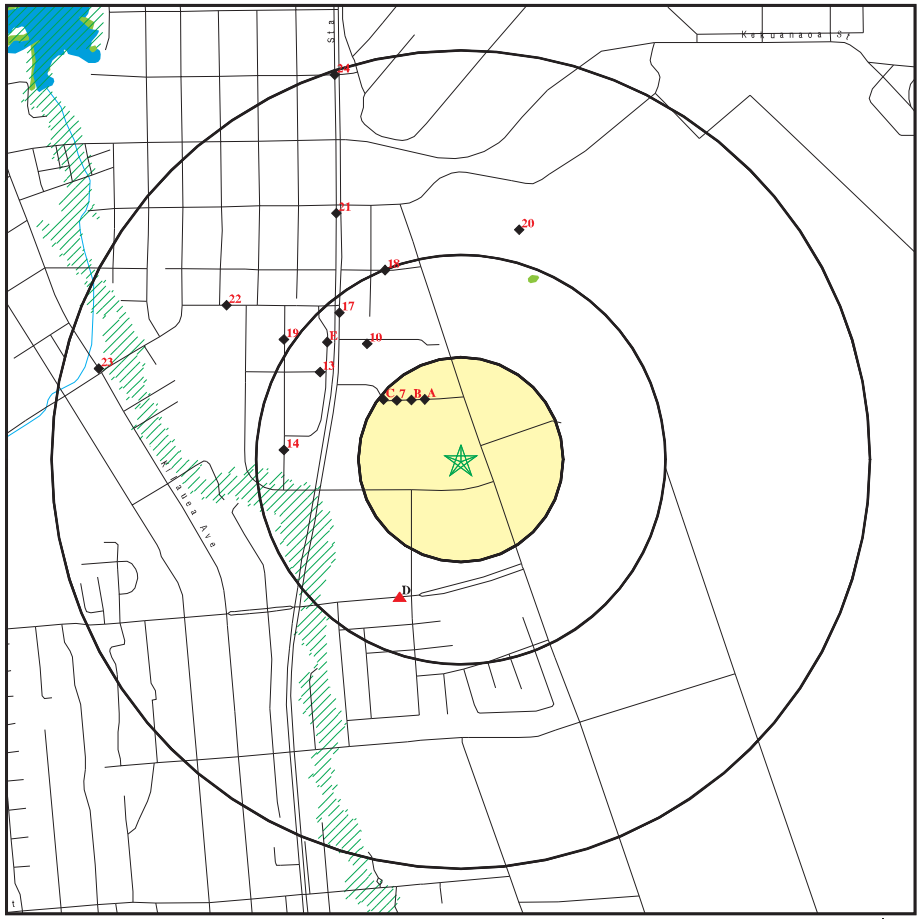
Lower Elevation	Address	Dist / Dir	Map ID	Page
HAWAII PEST CONTROL	***56 WIWOOLE ST***	***1/4 - 1/2 NW***	***E15***	***23***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
HAAHEO ELEMENTARY SCHOOL	SHWS, INST CONTROL
ARMY AVIATION SUPPORT FACILITY #2	SHWS
PACIFIC AQUACULTURE AND COASTAL RESOURCES CENTER	SHWS, BROWNFIELDS
ALAMO RENT A CAR, HILO INTERNATIONAL AIRPORT	SHWS, SPILLS
HILO JUDICIARY CENTER PROJECT	SHWS, INST CONTROL
LAEHALA STREET DRUM SITE	SHWS, SPILLS
HILO ARSENIC	SHWS, SPILLS, INST CONTROL
POHAKULOA TRAINING AREA	SHWS, SPILLS
187 SILVA STREET	SHWS, SPILLS, INST CONTROL
POHAKULOA TRAINING AREA	CERCLIS
HILO BURRITO	CERCLIS
SOUTH HILO LANDFILL	SWF/LF
YAMADA TRANSFER, INC.	FINDS, LUST
USARMY POHAKULOA TRAINING AREA	RCRA-SQG, FINDS
USDA ARS	RCRA-SQG, FINDS
WAIAKEA EXPERIMENTAL STATION	RCRA-NonGen
HAWAII PSD KULANI CORRECT STATE OF	RCRA-CESQG
EAST HAWAII REGIONAL SORT	FINDS
EAST HAWAII VETERANS CEMETERY	FINDS

OVERVIEW MAP - 2300100.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: DHHL East Makaala	CLIENT: Group 70 International, Inc.
ADDRESS: Makaala Street	CONTACT: Dricka Brown
Hilo HI 96720	INQUIRY #: 2300100.2s
LAT/LONG: 19.7003 / 155.0595	DATE: August 21, 2008 10:36 am

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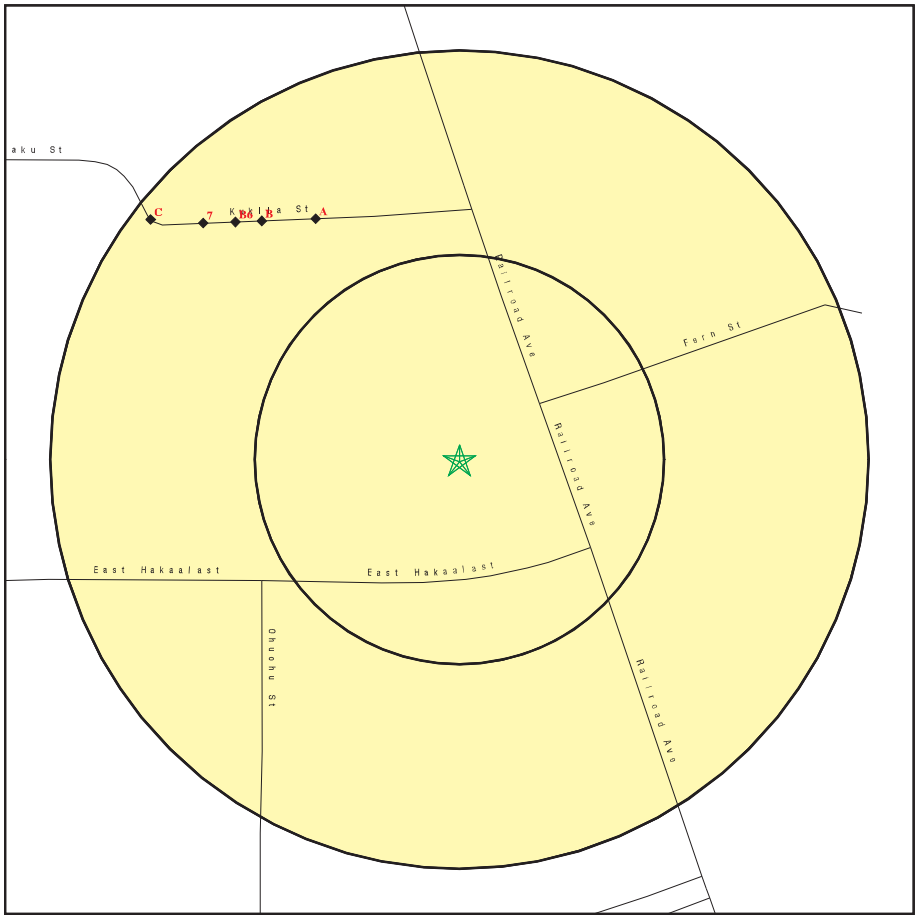
DETAIL MAP - 2300100.2s



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: DHHL East Makaala ADDRESS: Makaala Street Hilo HI 96720 LAT/LONG: 19.7003 / 155.0595	CLIENT: Group 70 International, Inc. CONTACT: Dricka Brown INQUIRY #: 2300100.2s DATE: August 21, 2008 10:36 am

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MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL RECORDS								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.500	0	0	1	NR	NR	1
LIENS 2		TP	NR	NR	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRA-TSDF		0.500	0	0	0	NR	NR	0
RCRA-LQG		0.250	0	1	NR	NR	NR	1
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	2	NR	NR	NR	2
RCRA-NonGen		0.250	0	0	NR	NR	NR	0
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
ERNS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
DOT OPS		TP	NR	NR	NR	NR	NR	0
US CDL		TP	NR	NR	NR	NR	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
STATE AND LOCAL RECORDS								
SHWS		1.000	0	1	1	6	NR	8
SWF/LF		0.500	0	0	0	NR	NR	0
LUST		0.500	0	1	7	NR	NR	8
UST		0.250	0	5	NR	NR	NR	5
SPILLS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INST CONTROL		0.500	0	0	1	NR	NR	1
VCP		0.500	0	0	0	NR	NR	0
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
BROWNFIELDS		0.500	0	0	0	NR	NR	0
AIRS		TP	NR	NR	NR	NR	NR	0
TRIBAL RECORDS								
INDIAN RESERV		1.000	0	0	0	0	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
EDR PROPRIETARY RECORDS								
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID / Direction / Distance / Elevation | Site | Database(s) | EDR ID Number / EPA ID Number

A1
NNW
1/8-1/4
0.171 mi.
904 ft.

M. SONOMURA CONTRACTING CO, INC. — **UST** — **U003155189** / **N/A**
100 KUKILA ST
HILO, HI 96720

Site 1 of 2 in cluster A

Relative: Lower

Actual: 64 ft.

UST:

Facility ID:	9-600657
Owner:	M. SONOMURA CONTRACTING CO, INC.
Owner Address:	100 KUKILA ST
Owner City,St,Zip:	Hilo, 96720 96720
Tank ID:	R-1
Date Installed:	6/2/1970
Tank Status:	**Permanently Out of Use**
Date Closed:	2/10/1990
Tank Capacity:	500
Substance:	Gasoline
Tank ID:	R-2
Date Installed:	6/2/1970
Tank Status:	**Permanently Out of Use**
Date Closed:	2/10/1990
Tank Capacity:	500
Substance:	Gasoline
Tank ID:	R-3
Date Installed:	6/2/1970
Tank Status:	**Permanently Out of Use**
Date Closed:	2/10/1990
Tank Capacity:	1000
Substance:	Diesel

A2
NNW
1/8-1/4
0.171 mi.
904 ft.

M SONOMURA CONTRACTING CO INC — **FINDS** — **1004464910**
100 KUKILA ST — **RCRA-CESQG** — **HID982474900**
HILO, HI 96720

Site 2 of 2 in cluster A

Relative: Lower

Actual: 64 ft.

FINDS:

Other Pertinent Environmental Activity Identified at Site

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

M SONOMURA CONTRACTING CO INC (Continued) **1004464910**

RCRA-CESQG:
Date form received by agency: 02/14/1989
Facility name: M SONOMURA CONTRACTING CO INC
Facility address: 100 KUKILA ST
HILO, HI 96720
EPA ID: HID982474900
Mailing address: KUKILA ST
HILO, HI 96720
Contact: ENVIRONMENTAL MANAGER
Contact address: 100 KUKILA ST
HILO, HI 96720
Contact country: US
Contact telephone: (808) 935-8561
Contact email: Not reported
EPA Region: 09
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:
Owner/operator name: M SONOMURA INVESTMENT
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: Unknown
Mixed waste (haz. and radioactive): Unknown
Recycler of hazardous waste: No

M SONOMURA CONTRACTING CO INC (Continued) **1004464910**

Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: Unknown
Furnace exemption: Unknown
Used oil fuel burner: No
Used oil processor: No
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
Off-site waste receiver: Commercial status unknown

Violation Status: No violations found

B3 **HILO WOOD TREATING, INC.** **SHWS** **S106817733**
NW **66 KUKILA ST** **N/A**
1/8-1/4 **HILO, HI 96720**
0.189 mi.
999 ft. **Site 1 of 4 in cluster B**

Relative:
Lower

Actual:
63 ft.

SHWS:
File Under: Hilo Wood Treating Inc (Samuel L. Kamelamela)
Supplement: Not reported
Restricted Use: Not reported
Restricted Use Comm: Not reported
Ic Relied On In Remedy: Not reported
Unit: Hilo Wood Treating, Inc.
Fed Id: Not reported
Funding: LMB
Agreement/program: State Site
Sitelist Name: Hilo Wood Treating, Inc.
Activity Type: File Review
Assignment Date: 10/1/2007
Activity Lead: Lynn Bailey
Assignment End Date: 10/1/2007
End fill: 10/1/2007
Result fill: File Review
Overall Status: Closed EI Follow-up/Site Referred

B4 **HILO WOOD TREATING, INC.** **FINDS** **1000327338**
NW **66 KUKILA ST.** **RCRA-LQG** **HID044011278**
1/8-1/4 **HILO, HI 96720** **RAATS**
0.189 mi.
999 ft. **Site 2 of 4 in cluster B**

Relative:
Lower

Actual:
63 ft.

FINDS:
Other Pertinent Environmental Activity Identified at Site

Not reported

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

HILO WOOD TREATING, INC. (Continued) **1000327338**

TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and its Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

RCRA-LQG:
Date form received by agency: 07/23/1991
Facility name: HILO WOOD TREATING CO INC
Facility address: 66 KUKILA STREET
HILO, HI 96720
EPA ID: HID044011278
Contact: Not reported
Contact address: Not reported
Not reported
Contact country: Not reported
Contact telephone: Not reported
Contact email: Not reported
EPA Region: 09
Land type: Facility is not located on Indian land. Additional information is not known.
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting

HILO WOOD TREATING, INC. (Continued) **1000327338**

from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:
Owner/operator name: STATE OF HAWAII DEPT. OF HAWAIIAN HOMES
Owner/operator address: P.O. BOX 1879
HONOLULU, HI 96805
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: KOPPERS COMPANY INC
Owner/operator address: KOPPERS BUILDING
CITY NOT REPORTED, PA 99999
Owner/operator country: Not reported
Owner/operator telephone: (412) 227-2000
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: Unknown
Mixed waste (haz. and radioactive): Unknown
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: Unknown
Furnace exemption: Unknown
Used oil fuel burner: No
Used oil processor: No
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
Off-site waste receiver: Commercial status unknown

Historical Generators:
Date form received by agency: 08/04/1980
Facility name: HILO WOOD TREATING CO INC
Classification: Large Quantity Generator

Facility Has Received Notices of Violations:
Regulation violated: F - 264.10-18.B
Area of violation: TSD - General
Date violation determined: 05/05/1994
Date achieved compliance: 06/05/2001
Violation lead agency: EPA
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER

HILO WOOD TREATING, INC. (Continued) **1000327338**

Enforcement action date: 09/29/1997
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: F - 264.10-18.B
Area of violation: TSD - General
Date violation determined: 05/05/1994
Date achieved compliance: 06/05/2001
Violation lead agency: EPA
Enforcement action: INITIAL 3008(A) COMPLIANCE
Enforcement action date: 05/05/1994
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: 199000
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 11/13/1986
Date achieved compliance: 09/08/1993
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 03/12/1986
Date achieved compliance: 09/08/1993
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/23/1986
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - 262.10-12.A
Area of violation: Generators - General
Date violation determined: 03/12/1986
Date achieved compliance: 09/08/1993
Violation lead agency: State
Enforcement action: INITIAL 3008(A) COMPLIANCE
Enforcement action date: 04/08/1987

HILO WOOD TREATING, INC. (Continued) **1000327338**

Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 06/05/2001
Evaluation: NOT A SIGNIFICANT NON-COMPLIER
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 02/13/1996
Evaluation: CASE DEVELOPMENT INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 05/05/1994
Evaluation: SIGNIFICANT NON-COMPLIER
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 09/08/1993
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/08/1993
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 06/05/2001
Evaluation lead agency: EPA

Evaluation date: 11/13/1986
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 09/08/1993
Evaluation lead agency: State

Evaluation date: 03/12/1986
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 09/08/1993
Evaluation lead agency: State

B5 **HILO WOOD TREATING INC.** **UST** **U003155214**
NW **66 KUKILA ST** **N/A**
1/8-1/4 **HILO, HI 96720**
0.189 mi.
999 ft. **Site 3 of 4 in cluster B**

Relative:
Lower

Actual:
63 ft.

UST:
Facility ID: 9-601324
Owner: HILO WOOD TREATING INC.
Owner Address: 66 KUKILA St
Ownder City,St,Zip: Hilo, 96720 96720

Tank ID: R-1
Date Installed: 4/21/1968
Tank Status: **Permanently Out of Use**
Date Closed: Not reported
Tank Capacity: 1000
Substance: Gasoline

B6 **AKANA PETROLEUM INC.** **UST** **U001237046**
NW **50 KUKILA ST** **N/A**
1/8-1/4 **HILO, HI 96720**
0.199 mi.
1052 ft. **Site 4 of 4 in cluster B**

Relative:
Lower

Actual:
62 ft.

UST:
Facility ID: 9-601743
Owner: AKANA PETROLEUM INC.
Owner Address: 50 KUKILA St
Ownder City,St,Zip: Hilo, 96720 96720

Tank ID: 87
Date Installed: 3/1/1988
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasoline

Tank ID: 92
Date Installed: 3/1/1988
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasoline

Tank ID: 98358
Date Installed: 3/1/1988
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 10000
Substance: Diesel

7 **DIVACO COOPERATIVE** **UST** **U001237014**
NW **30 KUKILA ST** **N/A**
1/8-1/4 **HILO, HI 96720**
0.213 mi.
1123 ft.

Relative:
Lower

Actual:
62 ft.

UST:
Facility ID: 9-601140
Owner: MS Auto Inc
Owner Address: 30 Kukila st
Ownder City,St,Zip: Hilo, 96720 96720

Tank ID: R-S-1
Date Installed: 1/1/1974
Tank Status: **Permanently Out of Use**
Date Closed: 12/23/1992
Tank Capacity: 4000
Substance: Gasoline

Tank ID: R-U-1
Date Installed: 1/1/1974
Tank Status: **Permanently Out of Use**
Date Closed: 12/23/1992
Tank Capacity: 4000
Substance: Gasoline

Tank ID: r-1
Date Installed: 8/1/1993
Tank Status: **Permanently Out of Use**
Date Closed: 2/28/2005
Tank Capacity: 6000
Substance: Gasoline

Tank ID: r-2
Date Installed: 8/1/1993
Tank Status: **Permanently Out of Use**
Date Closed: 2/28/2005
Tank Capacity: 4000
Substance: Gasoline

C8 **HILO WAREHOUSE** **FINDS** **1004688914**
NW **95 POHAKU ST** **LUST** **HID984469585**
1/8-1/4 **HILO, HI 96720** **RCRA-CESQG**
0.239 mi.
1260 ft. **Site 1 of 2 in cluster C**

Relative:
Lower

Actual:
62 ft.

FINDS:
Other Pertinent Environmental Activity Identified at Site

Not reported

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii

HILO WAREHOUSE (Continued) **1004688914**

state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

LUST:
Facility ID: 9-600564
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 30-Jul-93
Release ID: 930031
Project Officer: Not Assigned

RCRA-CESQG:
Date form received by agency: 07/30/1993
Facility name: HILO WAREHOUSE
Facility address: 95 POHAKU ST
HILO, HI 96720
EPA ID: HID984469585
Mailing address: P O BOX 2200
HONOLULU, HI 96841
Contact: HARLAN HASHIMOTO
Contact address: P O BOX 2200
HONOLULU, HI 96841
Contact country: US
Contact telephone: (808) 546-2562
Contact email: Not reported
EPA Region: 09
Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:
Owner/operator name: G T E HAWAIIAN TEL
Owner/operator address: P O BOX 2200
HONOLULU, HI 96841
Owner/operator country: Not reported
Owner/operator telephone: (808) 546-2562

HILO WAREHOUSE (Continued) **1004688914**

Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: Unknown
Mixed waste (haz. and radioactive): Unknown
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: Unknown
Furnace exemption: Unknown
Used oil fuel burner: No
Used oil processor: No
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
Off-site waste receiver: Commercial status unknown

Violation Status: No violations found

C9 **HILO WAREHOUSE** **UST U003155177**
NW **95 POHAKU ST** **N/A**
1/8-1/4 **HILO, HI 96720**
0.239 mi.
1260 ft. **Site 2 of 2 in cluster C**

Relative:
Lower

Actual:
62 ft.

UST:
Facility ID: 9-600564
Owner: Hawaiian Telcom
Owner Address: P.O. Box 2200
Ownder City,St,Zip: Hilo, 96720 96720

Tank ID: 3
Date Installed: 2/1/1993
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 4000
Substance: Gasoline

Tank ID: M-2
Date Installed: 7/2/1987
Tank Status: **Currently In Use**
Date Closed: Not reported
Tank Capacity: 550
Substance: Diesel

Tank ID: R-1
Date Installed: 7/2/1969
Tank Status: **Permanently Out of Use**
Date Closed: 11/12/1992
Tank Capacity: 1000

HILO WAREHOUSE (Continued) **U003155177**

Substance: Gasoline

10
NW
1/4-1/2
0.364 mi.
1920 ft.

Relative:
Lower

Actual:
50 ft.

KANOELEHUA OPERATIONS CENTER **LUST** **U001236868**
54 HALEKAUILA ST **SPILLS** **N/A**
HILO, HI 96720 **UST**

LUST:
Facility ID: 9-600238
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 14-Jul-00
Release ID: 000013
Project Officer: Richard Takaba

HI SPILLS:
Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19960708-0927
Units: HELCO Hill Power Plant Waste Oil Tank
Substances: Fuel Oil #6
Less Or Greater Than: Not reported
Numerical Quantity: 80
Units: Gallons
Activity Type: Response
Assignment Date: 7/8/1996
Activity Lead: Terry Corpus/Bill Perry
Assignment End Date: Not reported
Result: 8
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Incident: Waste oil placed into tank, but drainage plug was open. Observed spill at approximately 11:45 AM in trench designed to drain into WW facility. No oil reached WW treatment facility.Oil was contained within fuel trenches and removed by vac truck. Returned to tank.In preparation for painting, hydroblasting caused a small hole, releasing oil; oil contained within a sub-berm made; berm has earthen bottom. Oil collected via vacumm truck and being burned in the generating units.Leak from transformer radiator valve.Oil released while transformer was being filled due to overflow. Approx 5 gal spill onto blacktop pavement. Cleanup in progress.Release of 2000 gal waste water from Hill Power Plant on Big Island. Release had low pH 1, corrosive/acidic. Well is OK pH 7. 2000 gal went into injection well. Testing for TCLP of metals.
Initial: Contained, controlled source and cleaned up by contractor.courtesy notification takenTested pH and TCLP of metals. pH <2 chromium > 10 ppm. VIC to followup
Report: RP cleanup satisfactoryHill Plant #6 Drainage Well, UIC Permit No. UH-1242, Facility ID #84203.01 HI Electric Light Co. Inc.

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19960821-1530
Units: Hill Generating Station
Substances: Oil, non PCB
Less Or Greater Than: Not reported
Numerical Quantity: 200
Units: Gallons
Activity Type: Response
Assignment Date: 8/21/1996
Activity Lead: Mike Cripps

KANOELEHUA OPERATIONS CENTER (Continued) **U001236868**

Assignment End Date: Not reported
Result: 8
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Incident: Waste oil placed into tank, but drainage plug was open. Observed spill at approximately 11:45 AM in trench designed to drain into WW facility. No oil reached WW treatment facility.Oil was contained within fuel trenches and removed by vac truck. Returned to tank.In preparation for painting, hydroblasting caused a small hole, releasing oil; oil contained within a sub-berm made; berm has earthen bottom. Oil collected via vacumm truck and being burned in the generating units.Leak from transformer radiator valve.Oil released while transformer was being filled due to overflow. Approx 5 gal spill onto blacktop pavement. Cleanup in progress.Release of 2000 gal waste water from Hill Power Plant on Big Island. Release had low pH 1, corrosive/acidic. Well is OK pH 7. 2000 gal went into injection well. Testing for TCLP of metals.
Initial: Contained, controlled source and cleaned up by contractor.courtesy notification takenTested pH and TCLP of metals. pH <2 chromium > 10 ppm. VIC to followup
Report: RP cleanup satisfactoryHill Plant #6 Drainage Well, UIC Permit No. UH-1242, Facility ID #84203.01 HI Electric Light Co. Inc.

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 19970110-0946
Units: HELCO Hill Generating Station Wastewater System Leak Incident
Substances: Waste Water
Less Or Greater Than: Not reported
Numerical Quantity: 2000
Units: Gallons
Activity Type: Response
Assignment Date: 1/10/1997
Activity Lead: Terry Corpus
Assignment End Date: Not reported
Result: 8
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Incident: Waste oil placed into tank, but drainage plug was open. Observed spill at approximately 11:45 AM in trench designed to drain into WW facility. No oil reached WW treatment facility.Oil was contained within fuel trenches and removed by vac truck. Returned to tank.In preparation for painting, hydroblasting caused a small hole, releasing oil; oil contained within a sub-berm made; berm has earthen bottom. Oil collected via vacumm truck and being burned in the generating units.Leak from transformer radiator valve.Oil released while transformer was being filled due to overflow. Approx 5 gal spill onto blacktop pavement. Cleanup in progress.Release of 2000 gal waste water from Hill Power Plant on Big Island. Release had low pH 1, corrosive/acidic. Well is OK pH 7. 2000 gal went into injection well. Testing for TCLP of metals.
Initial: Contained, controlled source and cleaned up by contractor.courtesy notification takenTested pH and TCLP of metals. pH <2 chromium > 10 ppm. VIC to followup
Report: RP cleanup satisfactoryHill Plant #6 Drainage Well, UIC Permit No. UH-1242, Facility ID #84203.01 HI Electric Light Co. Inc.

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20041115-1423
Units: Transformer Overflow
Substances: Mineral Oil
Less Or Greater Than: Not reported
Numerical Quantity: 5
Units: Gallons

KANOELEHUA OPERATIONS CENTER (Continued) **U001236868**

Activity Type: Response
Assignment Date: 11/15/2004
Activity Lead: Mike Cripps
Assignment End Date: 2/8/2005
Result: 8
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Incident: Waste oil placed into tank, but drainage plug was open. Observed spill at approximately 11:45 AM in trench designed to drain into WW facility. No oil reached WW treatment facility.Oil was contained within fuel trenches and removed by vac truck. Returned to tank.In preparation for painting, hydroblasting caused a small hole, releasing oil; oil contained within a sub-berm made; berm has earthen bottom. Oil collected via vacumm truck and being burned in the generating units.Leak from transformer radiator valve.Oil released while transformer was being filled due to overflow. Approx 5 gal spill onto blacktop pavement. Cleanup in progress.Release of 2000 gal waste water from Hill Power Plant on Big Island. Release had low pH 1, corrosive/acidic. Well is OK pH 7. 2000 gal went into injection well. Testing for TCLP of metals.
Initial: Contained, controlled source and cleaned up by contractor.courtesy notification takenTested pH and TCLP of metals. pH <2 chromium > 10 ppm. VIC to followup
Report: RP cleanup satisfactoryHill Plant #6 Drainage Well, UIC Permit No. UH-1242, Facility ID #84203.01 HI Electric Light Co. Inc.

Island: Hawaii
Supplemental Loc. Text: Not reported
Case Number: 20030530-1551
Units: HELCO pad-mounted transformer 15923
Substances: Shell Diala Oil
Less Or Greater Than: Not reported
Numerical Quantity: 100
Units: Gallons
Activity Type: Response
Assignment Date: 5/30/2003
Activity Lead: Mike Cripps
Assignment End Date: Not reported
Result: 8
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Incident: Waste oil placed into tank, but drainage plug was open. Observed spill at approximately 11:45 AM in trench designed to drain into WW facility. No oil reached WW treatment facility.Oil was contained within fuel trenches and removed by vac truck. Returned to tank.In preparation for painting, hydroblasting caused a small hole, releasing oil; oil contained within a sub-berm made; berm has earthen bottom. Oil collected via vacumm truck and being burned in the generating units.Leak from transformer radiator valve.Oil released while transformer was being filled due to overflow. Approx 5 gal spill onto blacktop pavement. Cleanup in progress.Release of 2000 gal waste water from Hill Power Plant on Big Island. Release had low pH 1, corrosive/acidic. Well is OK pH 7. 2000 gal went into injection well. Testing for TCLP of metals.
Initial: Contained, controlled source and cleaned up by contractor.courtesy notification takenTested pH and TCLP of metals. pH <2 chromium > 10 ppm. VIC to followup
Report: RP cleanup satisfactoryHill Plant #6 Drainage Well, UIC Permit No. UH-1242, Facility ID #84203.01 HI Electric Light Co. Inc.

Click this hyperlink while viewing on your computer to access
1 additional HI SPILLS: record(s) in the EDR Site Report.

UST:
Facility ID: 9-600238

KANOELEHUA OPERATIONS CENTER (Continued) **U001236868**

Owner: HAWAII ELECTRIC LIGHT CO., INC.
Owner Address: P.O. BOX 1027
Ownder City,St,Zip: Hilo, 96720 96720

Tank ID: 1
Date Installed: 12/1/1999
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 10000
Substance: Gasoline

Tank ID: 2
Date Installed: 12/1/1999
Tank Status: Currently In Use
Date Closed: Not reported
Tank Capacity: 6000
Substance: Diesel

Tank ID: R-1
Date Installed: 4/16/1970
Tank Status: Permanently Out of Use
Date Closed: 10/12/1999
Tank Capacity: 6000
Substance: Diesel

Tank ID: R-2
Date Installed: 4/17/1975
Tank Status: Permanently Out of Use
Date Closed: 1/22/1992
Tank Capacity: 1000
Substance: Diesel

Tank ID: R-3
Date Installed: 4/16/1977
Tank Status: Permanently Out of Use
Date Closed: 10/12/1999
Tank Capacity: 10000
Substance: Gasoline

D11 **SEARS ROEBUCK & COMPANY** **FINDS 1006841782**
SSW **111 E PUAINAKO ST** **LUST 110014031403**
1/4-1/2 **HILO, HI 96720** **SPILLS**
0.366 mi.
1934 ft. **Site 1 of 2 in cluster D**

Relative: Higher
FINDS:
Other Pertinent Environmental Activity Identified at Site

Actual: 88 ft.
HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

SEARS ROEBUCK & COMPANY (Continued) **1006841782**

LUST:
- Facility ID: 9-601834
- Facility Status: Site Cleanup Completed (NFA)
- Facility Status Date: 04-Jan-98
- Release ID: 940040
- Project Officer: Jose Ruiz

HI SPILLS:
- Island: Hawaii
- Supplemental Loc. Text: Prince Kuhio Plaza
- Case Number: 19960413-1459
- Units: Safeway Store in Prince Kuhio Plaza
- Substances: Not reported
- Less Or Greater Than: Not reported
- Numerical Quantity: Not reported
- Units: Not reported
- Activity Type: Response
- Assignment Date: 4/13/1996
- Activity Lead: Terry Corpus
- Assignment End Date: Not reported
- Result: 8
- File Under: Not reported
- Incident: Unknown gas in store affecting workers & customers causes dryness of throat; no teary eyes.
- Initial: On-scene to assist Hazmat team. Store closed. will reopen @ 7:00 PM
- Report: Not reported

D12 SSW 1/4-1/2 0.366 mi. 1934 ft. **PRINCE KUHIO PLAZA** **LUST U003790356**
111 E PUAINAKO ST **UST N/A**
HILO, HI 96720

Site 2 of 2 in cluster D

Relative: Higher

Actual: 88 ft.

LUST:
- Facility ID: 9-603106
- Facility Status: Site Cleanup Completed (NFA)
- Facility Status Date: 31-Oct-02
- Release ID: 030002
- Project Officer: Richard Takaba

UST:
- Facility ID: 9-603106
- Owner: GENERAL GROWTH PROPERTIES INC.
- Owner Address: 111 EAST PUAINAKO
- Owner City,St,Zip: Hilo, 96720 96720

- Tank ID: R-M-1
- Date Installed: 1/1/1984
- **Tank Status: Permanently Out of Use**
- Date Closed: 12/10/1998
- Tank Capacity: 300
- Substance: Diesel

13 WNW 1/4-1/2 0.405 mi. 2138 ft. **CHIKA NAKANO REPAIR SHOP, INC.** **LUST U001236871**
90 POOKELA ST **UST N/A**
HILO, HI 96720

Relative: Lower

Actual: 61 ft.

LUST:
- Facility ID: 9-600448
- Facility Status: Site Cleanup Completed (NFA)
- Facility Status Date: 23-Nov-98
- Release ID: 980154
- Project Officer: Jeffrey Ung

UST:
- Facility ID: 9-600448
- Owner: CHIKA NAKANO REPAIR SHOP, INC.
- Owner Address: 90 POOKELA ST
- Owner City,St,Zip: Hilo, 96720 96720

- Tank ID: 5
- Date Installed: 5/1/1998
- **Tank Status: Currently In Use**
- Date Closed: Not reported
- Tank Capacity: 4000
- Substance: Diesel

- Tank ID: 87
- Date Installed: 5/1/1998
- **Tank Status: Currently In Use**
- Date Closed: Not reported
- Tank Capacity: 10000
- Substance: Gasoline

- Tank ID: 92
- Date Installed: 5/1/1998
- **Tank Status: Currently In Use**
- Date Closed: Not reported
- Tank Capacity: 6000
- Substance: Gasoline

- Tank ID: R-1
- Date Installed: 6/2/1971
- **Tank Status: Permanently Out of Use**
- Date Closed: 5/13/1998
- Tank Capacity: 2000
- Substance: Gasoline

- Tank ID: R-2
- Date Installed: 6/1/1969
- **Tank Status: Permanently Out of Use**
- Date Closed: 5/13/1998
- Tank Capacity: 2000
- Substance: Gasoline

CHIKA NAKANO REPAIR SHOP, INC. (Continued) **U001236871**

Tank ID: R-3
Date Installed: 6/1/1969
Tank Status: Permanently Out of Use
Date Closed: 5/13/1998
Tank Capacity: 1000
Substance: Diesel

14
West
1/4-1/2
0.433 mi.
2284 ft.

Relative: Lower

Actual: 68 ft.

TOM OKANO ENTERPRISES, INC **FINDS 1006842149**
202 HOLOMUA ST **LUST 110014035597**
HILO, HI 96720

FINDS:
Other Pertinent Environmental Activity Identified at Site

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

LUST:
Facility ID: 9-602933
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 13-Feb-96
Release ID: 940168
Project Officer: David Hodges

E15
NW
1/4-1/2
0.434 mi.
2293 ft.

Relative: Lower

Actual: 49 ft.

HAWAII PEST CONTROL **SHWS 1006820888**
56 WIWOOLE ST **FINDS 110013789132**
HILO, HI 96720 **INST CONTROL**

Site 1 of 2 in cluster E

SHWS:
File Under: Hawaii Pest Control
Supplement: Unit A
Restricted Use: The site is under evaluation for land use control.
Restricted Use Comm: Unknown
Ic Relied On In Remedy: Unknown
Unit: Hawaii Pest Control
Fed Id: HI0000603266
Funding: Report Ongoing
Agreement/program: State Site Program
Sitelist Name: Hawaii Pest Control
Activity Type: Remedial
Assignment Date: 1/4/2005
Activity Lead: Mark Sutterfield
Assignment End Date: Not reported
End fill: 4/4/2008
Result fill: Ongoing
Overall Status: Ongoing EI (Environmental Interest)

FINDS:

HAWAII PEST CONTROL (Continued) **1006820888**

Other Pertinent Environmental Activity Identified at Site

Not reported

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

HI INSTUTIONAL CONTROL:
Restricted Use: The site is under evaluation for land use control.
Comments on Restricted Use: Unknown
IC Relied on in Remedy: Unknown
File Under: Hawaii Pest Control

E16
NW
1/4-1/2
0.449 mi.
2372 ft.

Relative: Lower

Actual: 50 ft.

HAWAII PEST CONTROL **CERC-NFRAP 1004654728**
56A WIWOOLE STREET **HI0000603266**
HILO, HI 96720

Site 2 of 2 in cluster E

CERC-NFRAP:
Site ID: 0905357
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP

CERCLIS-NFRAP Site Contact Name(s):
Contact Name: Matt Mitguard
Contact Tel: (415) 972-3096
Contact Title: Site Assessment Manager (SAM)

Contact Name: Eugenia Chow
Contact Tel: (415) 972-3160
Contact Title: Site Assessment Manager (SAM)

Site Description: Not reported

CERCLIS-NFRAP Assessment History:
Action: DISCOVERY
Date Started: Not reported
Date Completed: 02/14/1997
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: Not reported
Date Completed: 09/14/1999
Priority Level: NFRAP (No Futher Remedial Action Planned

Action: ARCHIVE SITE
Date Started: Not reported
Date Completed: 07/24/2000
Priority Level: Not reported

17
NW
1/4-1/2
0.465 mi.
2457 ft.

BIG ISLAND VEHICLE CENTER — **FINDS** **1006842548**
811 KANOELEHUA AVE — **LUST** **110014039922**
HILO, HI 96720

Relative:
Lower

Actual:
40 ft.

FINDS:
Other Pertinent Environmental Activity Identified at Site

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

LUST:
Facility ID: 9-601309
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 18-Jan-02
Release ID: 020009
Project Officer: Shaobin Li

18
NNW
1/4-1/2
0.499 mi.
2632 ft.

COUNTY OF HAWAII - SHULTZ SIDING — **FINDS** **1006842659**
630 E LANIKAULA ST — **LUST** **110014041214**
HILO, HI 96720

Relative:
Lower

Actual:
38 ft.

FINDS:
Other Pertinent Environmental Activity Identified at Site

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

LUST:
Facility ID: 9-600453
Facility Status: Site Cleanup Completed (NFA)
Facility Status Date: 08-Apr-98
Release ID: 950027
Project Officer: Janet Sherrer

19
NW
1/2-1
0.522 mi.
2758 ft.

HILO MECHANICAL, INC — **SHWS** **1006820676**
50 HOLOMUA ST — **FINDS** **110013786778**
HILO, HI 96720

Relative:
Lower

Actual:
57 ft.

SHWS:
File Under: Hilo Mechanical, Inc.
Supplement: Not reported
Restricted Use: Not reported
Restricted Use Comm: Not reported
Ic Relied On In Remedy: Not reported
Unit: Hilo Mechanical, Inc.

HILO MECHANICAL, INC (Continued) — **1006820676**

Fed Id: Not reported
Funding: LMB
Agreement/program: State Site
Sitelist Name: Hilo Mechanical, Inc.
Activity Type: File Review
Assignment Date: 10/1/2007
Activity Lead: Lynn Bailey
Assignment End Date: 10/1/2007
End fill: 10/1/2007
Result fill: Status Update
Overall Status: Complete NFA (No Further Action)

FINDS:
Other Pertinent Environmental Activity Identified at Site

Not reported

HI-UST (Hawaii - Underground Storage Tank). Hawaii Underground Storage Tank Program regulates underground storage tanks which store petroleum or hazardous substances and offers documents and data products for downloading.

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

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20
NNE
1/2-1
0.580 mi.
3061 ft.

HILO RUBBISH DUMP — **SHWS** **1006820672**
LEILANI ST — **FINDS** **110013786723**
HILO, HI 96720 — **SPILLS**

Relative:
Lower

Actual:
18 ft.

SHWS:
File Under: County of Hawaii, Department of Public Works, Solid Waste Division
Supplement: Not reported
Restricted Use: Not reported
Restricted Use Comm: Not reported
Ic Relied On In Remedy: Not reported
Unit: Hilo Landfill (HID000606582)
Fed Id: Not reported
Funding: Not reported
Agreement/program: Not reported
Sitelist Name: Hilo Landfill (HID000606582)
Activity Type: Site Assessment
Assignment Date: 2/13/2008
Activity Lead: John Peard
Assignment End Date: Not reported
End fill: 4/4/2008
Result fill: Ongoing
Overall Status: Ongoing

FINDS:
Other Pertinent Environmental Activity Identified at Site

Not reported

HILO RUBBISH DUMP (Continued) **1006820672**

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

HI SPILLS:
- Island: Hawaii
- Supplemental Loc. Text: Not reported
- Case Number: 19921224
- Units: Hilo Rubbish Dump
- Substances: Diesel Fuel
- Less Or Greater Than: Not reported
- Numerical Quantity: Not reported
- Units: Not reported
- Activity Type: Response
- Assignment Date: Not reported
- Activity Lead: Bill Perry
- Assignment End Date: Not reported
- Result: 8
- File Under: County of Hawaii, Department of Public Works, Solid Waste Division
- Incident: A dark colored liquid substance on the surface of run-off water from heavy rains accompanied by a surface sheen on water in still pools was a result of a fuel spill. The water product was flowing from a earthen bank approximately 10 Ft high
- Initial: DOH-HEER had Dr. Bowen take samples of spill & the results was the contents were a Hydrocarbon or Diesel Fuel. Quantity was so small it did not pose any concern about potential health effects. Suggested that affected areas be monitor-
- Report: Not reported

21
NNW
1/2-1
0.674 mi.
3560 ft.

Relative:
Lower

Actual:
30 ft.

STATIONERS CORPORATION OF HAWAII **SHWS S108009231**
708 KANOELEHUA AVE **SPILLS N/A**
HILO, HI 96720

SHWS:
- File Under: Not reported
- Supplement: ESA Limited Phase II Investigation
- Restricted Use: Not reported
- Restricted Use Comm: Not reported
- Ic Relied On In Remedy: Not reported
- Unit: Stationers Corporation of Hawaii
- Fed Id: Not reported
- Funding: Report Ongoing
- Agreement/program: State Site Program
- Sitelist Name: Stationers Corporation of Hawaii
- Activity Type: File Review
- Assignment Date: 11/23/2005
- Activity Lead: Unassigned
- Assignment End Date: Not reported
- End fill: 4/4/2008
- Result fill: Ongoing
- Overall Status: Ongoing EI (Environmental Interest)

STATIONERS CORPORATION OF HAWAII (Continued) **S108009231**

HI SPILLS:
- Island: Hawaii
- Supplemental Loc. Text: ESA Limited Phase II Investigation
- Case Number: 20051123-0823
- Units: Building Materials Survey - Typewriter Cleaning Station
- Substances: Unknown
- Less Or Greater Than: Not reported
- Numerical Quantity: Not reported
- Units: Not reported
- Activity Type: Response
- Assignment Date: 11/23/2005
- Activity Lead: Curtis Martin
- Assignment End Date: 11/23/2005
- Result: 7
- File Under: Not reported
- Incident: Notification only
- Initial: Not reported
- Report: Not reported

22
WNW
1/2-1
0.685 mi.
3618 ft.

Relative:
Lower

Actual:
45 ft.

HILO SODA WORKS **SHWS U003155315**
270 E KAWILI ST **LUST N/A**
HILO, HI 96720 **UST**

SHWS:
- File Under: Hilo Soda Works (Former)
- Supplement: Not reported
- Restricted Use: Not reported
- Restricted Use Comm: Not reported
- Ic Relied On In Remedy: Not reported
- Unit: Hilo Soda Works Tank Closure
- Fed Id: Not reported
- Funding: LMB
- Agreement/program: State Site
- Sitelist Name: Hilo Soda Works Tank Closure
- Activity Type: File Review
- Assignment Date: 10/1/2007
- Activity Lead: Lynn Bailey
- Assignment End Date: 10/1/2007
- End fill: 10/1/2007
- Result fill: File Review
- Overall Status: Complete NFA (No Further Action)

LUST:
- Facility ID: 9-603256
- Facility Status: Site Cleanup Completed (NFA)
- Facility Status Date: 31-Jul-97
- Release ID: 970025
- Project Officer: Jose Ruiz

UST:
- Facility ID: 9-603256
- Owner: HILO SODA WORKS
- Owner Address: 145 KEOULA ST
- Ownder City,St,Zip: Hilo, 96720 96720

HILO SODA WORKS (Continued) **U003155315**

Tank ID: R-1
Date Installed: 1/1/1970
Tank Status: Permanently Out of Use
Date Closed: 12/4/1996
Tank Capacity: 550
Substance: Diesel

Tank ID: R-2
Date Installed: 1/1/1964
Tank Status: Permanently Out of Use
Date Closed: 12/4/1996
Tank Capacity: 550
Substance: Gasoline

23
WNW
1/2-1
0.912 mi.
4815 ft.

USDA FOREST SERVICE PSW EXPERIMENTAL STATION **SHWS 1006819479**
1643 KILAUEA AVE **FINDS 110013772845**
HILO, HI 96720

Relative:
Lower

Actual:
45 ft.

SHWS:
File Under: United States, Department of Agriculture, Forest Service
Supplement: PSW Experimental Station Kawili St & Kilauea Ave
Restricted Use: Not reported
Restricted Use Comm: Not reported
Ic Relied On In Remedy: Not reported
Unit: USDA Forest Service PSW Experimental Station
Fed Id: HI0122390008
Funding: S FY 1996
Agreement/program: State Site
Sitelist Name: USDA Forest Service PSW Experimental Station
Activity Type: ISST
Assignment Date: 4/14/1996
Activity Lead: Unknown
Assignment End Date: 4/15/1996
End fill: 4/15/1996
Result fill: ISST Ranked NFA
Overall Status: SDAR NFA

FINDS:
Other Pertinent Environmental Activity Identified at Site

Not reported

The HI-ECS (Hawaii Environmental Compliance Program) is the Hawaii state regulatory program relating to environmental compliance and hazardous materials that ensures that program areas and facilities are in compliance with environmental regulations

24
NNW
1/2-1
0.990 mi.
5227 ft.

HELCO PIPELINE RELEASE HUALANI HILO **SHWS S106817545**
KANOELEHUA AVE / HUALANI ST **N/A**
HILO, HI 96720

Relative:
Lower

Actual:
30 ft.

SHWS:
File Under: Hawaii Electric Light Co., Inc. (HELCO)
Supplement: Not reported
Restricted Use: Not reported
Restricted Use Comm: Not reported
Ic Relied On In Remedy: Not reported
Unit: HELCO Pipeline Release Hualani Hilo
Fed Id: Not reported
Funding: Report Ongoing
Agreement/program: State Site Program
Sitelist Name: HELCO Pipeline Release Hualani Hilo
Activity Type: EP&R Case 20040113-1045 Referred to SDAR
Assignment Date: 6/3/2004
Activity Lead: Unassigned
Assignment End Date: Not reported
End fill: 4/4/2008
Result fill: Ongoing
Overall Status: Ongoing EI (Environmental Interest)

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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.

FEDERAL RECORDS

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: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
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 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

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.

Date of Government Version: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

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: 04/30/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: EPA
Telephone: N/A
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
HILO	1000860450	HAWAII PSD KULANI CORRECT STATE OF	HC 01 STAINBACK HWY	96720	RCRA-CESQG
HILO	1000707625	POHAKULOA TRAINING AREA	BLDG. 36, SADDLE RD HWY 200, 36 M MARKER	96720	CERCLIS
HILO	S108859934	HAAHEO ELEMENTARY SCHOOL	HAAHEO ROAD	96720	SHWS, INST CONTROL
HILO	S108800478	ARMY AVIATION SUPPORT FACILITY #2	HILO INTERNATIONAL AIRPORT BUILDING 619	96720	SHWS
HILO	S108859939	PACIFIC AQUACULTURE AND COASTAL RESOURCES CENTER	KALANIANAOLE ST		SHWS, BROWNFIELDS
HILO	S106816095	ALAMO RENT A CAR, HILO INTERNATIONAL AIRPORT	131 KEKUANAOA PL	96720	SHWS, SPILLS
HILO	S107025566	HILO JUDICIARY CENTER PROJECT	KILAUEA AVE		SHWS, INST CONTROL
HILO	S106818659	LAEHALA STREET DRUM SITE	LAEHALA ST	96720	SHWS, SPILLS
HILO	1006843120	YAMADA TRANSFER, INC.	573 LANIKAULA ST	96720	FINDS, LUST
HILO	1009403824	EAST HAWAII REGIONAL SORT	LEILANI STREET EXTENSION	96720	FINDS
HILO	S108088859	HILO ARSENIC	338 LILUOKALANI LN	96720	SHWS, SPILLS, INST CONTROL
HILO	1008170102	EAST HAWAII VETERANS CEMETERY	NWC PIKAKE/ UUHOU STS	96720	FINDS
HILO	1007117493	HILO BURRITO	PONAHAWAI ST AND KAMEHAMEHA AVE		CERCLIS
HILO	1001112098	USARMY POHAKULOA TRAINING AREA	36 SADDLE RD HWY 200 MI MKR 36	96720	RCRA-SQG, FINDS
HILO	S106820075	POHAKULOA TRAINING AREA	SADDLE RD	96720	SHWS, SPILLS
HILO	S108859616	187 SILVA STREET	187 SILVA ST	96720	SHWS, SPILLS, INST CONTROL
HILO	1000141640	USDA ARS	STAINBACK HWY	96720	RCRA-SQG, FINDS
HILO	S102316411	WAIAKEA EXPERIMENTAL STATION	STAINBACK HWY 1 MI W OF	96720	RCRA-NonGen
SOUTH HILO, HAWAII	S106401333	SOUTH HILO LANDFILL	SOUTH HILO	96720	SWF/LF

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: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS 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). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 04/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 26

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 07/22/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS 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 this 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. This 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 a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 06/17/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Quarterly

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: 06/13/2008
Date Data Arrived at EDR: 06/27/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/26/2008
Date Data Arrived at EDR: 04/02/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 34

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Transporters, 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.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 05/12/2008
Date Data Arrived at EDR: 06/13/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 08/21/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

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: 05/12/2008
Date Data Arrived at EDR: 06/13/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 08/21/2008
Next Scheduled EDR Contact: 11/17/2008
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: 05/12/2008
Date Data Arrived at EDR: 06/13/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 08/21/2008
Next Scheduled EDR Contact: 11/17/2008
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: 05/12/2008
Date Data Arrived at EDR: 06/13/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 08/21/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non 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). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 05/12/2008
Date Data Arrived at EDR: 06/13/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 56

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 08/21/2008
Next Scheduled EDR Contact: 11/17/2008
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: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28
Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
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: 04/04/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28
Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

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: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54
Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 07/25/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 04/16/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 29
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 05/14/2008
Date Data Arrived at EDR: 05/28/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 72
Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 05/28/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

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.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25
Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 06/27/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 04/30/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 30
Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 07/15/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Semi-Annually

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: 703-692-8801
Last EDR Contact: 08/08/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Semi-Annually

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: 12/31/2006
Date Data Arrived at EDR: 08/31/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 41
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Varies

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: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31
Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 06/09/2008
Next Scheduled EDR Contact: 09/08/2008
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: 02/08/2008
Date Data Arrived at EDR: 04/25/2008
Date Made Active in Reports: 05/30/2008
Number of Days to Update: 35
Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

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: 01/14/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8
Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52
Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

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

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28
Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 06/23/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Varies

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 02/07/2008
Date Data Arrived at EDR: 03/26/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 23
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 06/25/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Semi-Annually

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.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49
Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Annually

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: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46
Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 08/11/2008
Next Scheduled EDR Contact: 10/13/2008
Data Release Frequency: Every 4 Years

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.

Date of Government Version: 04/11/2008
Date Data Arrived at EDR: 04/24/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 27
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
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: 04/11/2008
Date Data Arrived at EDR: 04/24/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 27
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 06/16/2008
Next Scheduled EDR Contact: 09/15/2008
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: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data 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
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

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: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
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: 04/24/2008
Date Data Arrived at EDR: 06/10/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 59

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 07/14/2008
Next Scheduled EDR Contact: 10/13/2008
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: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 08/07/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Annually

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: 04/22/2008
Date Data Arrived at EDR: 05/06/2008
Date Made Active in Reports: 06/09/2008
Number of Days to Update: 34

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Quarterly

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: 04/29/2008
Date Data Arrived at EDR: 05/01/2008
Date Made Active in Reports: 05/21/2008
Number of Days to Update: 20

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/31/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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: 04/03/2008
Date Data Arrived at EDR: 04/08/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 28

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 06/30/2008
Next Scheduled EDR Contact: 09/29/2008
Data Release Frequency: Quarterly

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

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 06/11/2008
Next Scheduled EDR Contact: 09/08/2008
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

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: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34

Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/18/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Semi-Annually

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: 05/19/2004
Date Data Arrived at EDR: 05/20/2004
Date Made Active in Reports: 06/22/2004
Number of Days to Update: 33

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 08/04/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

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: 06/30/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 20
Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 06/27/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Semi-Annually

UST: Underground Storage Tank Database
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery 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: 06/30/2008
Date Data Arrived at EDR: 07/02/2008
Date Made Active in Reports: 07/24/2008
Number of Days to Update: 22
Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 06/27/2008
Next Scheduled EDR Contact: 09/22/2008
Data Release Frequency: Semi-Annually

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: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/18/2008
Next Scheduled EDR Contact: 09/15/2008
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: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/18/2008
Next Scheduled EDR Contact: 09/15/2008
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: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/18/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

DRYCLEANERS: Permitted Drycleaner Facility Listing
A listing of permitted drycleaner facilities in the state.

Date of Government Version: 03/28/2008
Date Data Arrived at EDR: 03/28/2008
Date Made Active in Reports: 04/24/2008
Number of Days to Update: 27
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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: 04/04/2008
Date Data Arrived at EDR: 06/18/2008
Date Made Active in Reports: 07/22/2008
Number of Days to Update: 34
Source: Department of Health
Telephone: 808-586-4249
Last EDR Contact: 06/18/2008
Next Scheduled EDR Contact: 09/15/2008
Data Release Frequency: Varies

AIRS: List of Permitted Facilities
A listing of permitted facilities in the state.

Date of Government Version: 03/28/2008
Date Data Arrived at EDR: 03/28/2008
Date Made Active in Reports: 04/24/2008
Number of Days to Update: 27
Source: Department of Health
Telephone: 808-586-4200
Last EDR Contact: 07/28/2008
Next Scheduled EDR Contact: 10/27/2008
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34
Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 08/08/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Semi-Annually

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: 05/27/2008
Next Scheduled EDR Contact: 08/25/2008
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/30/2008
Date Data Arrived at EDR: 05/30/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 70
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 07/11/2008
Date Data Arrived at EDR: 07/11/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 28
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/28/2008
Date Data Arrived at EDR: 06/10/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 59

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 06/16/2008
Date Data Arrived at EDR: 06/16/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 53

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
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: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 03/17/2008
Date Data Arrived at EDR: 03/27/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 40

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/21/2007
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 34

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/16/2008
Date Data Arrived at EDR: 06/16/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 53

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 05/28/2008
Date Data Arrived at EDR: 06/10/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 59

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 07/11/2008
Date Data Arrived at EDR: 07/11/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 05/30/2008
Date Data Arrived at EDR: 06/27/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 42

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 08/18/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Quarterly

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: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/21/2008
Next Scheduled EDR Contact: 10/20/2008
Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: 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

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: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
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.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

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, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

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GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

DHHL EAST MAKAALA
MAKAALA STREET
HILO, HI 96720

TARGET PROPERTY COORDINATES

Latitude (North):	19.70029 - 19° 42' 1.0"
Longitude (West):	155.05954 - 155° 3' 34.3"
Universal Tranverse Mercator:	Zone 5
UTM X (Meters):	284117.1
UTM Y (Meters):	2179494.5
Elevation:	77 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	19155-F1 HILO, HI
Most Recent Revision:	Not reported

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 principle 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.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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).

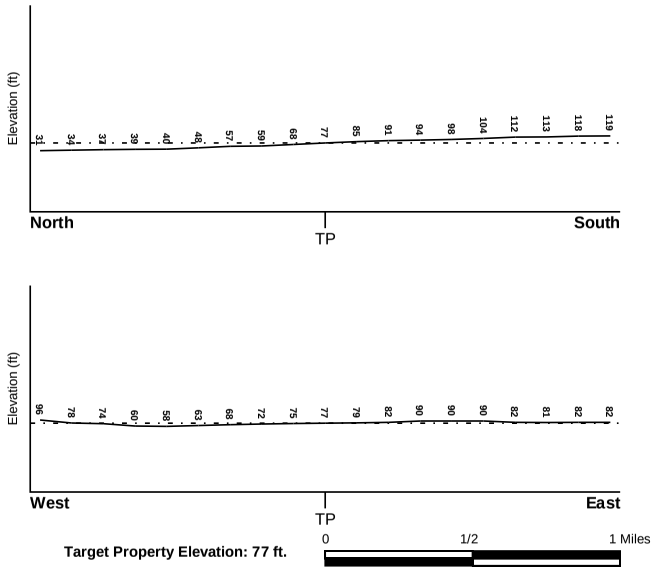
TOPOGRAPHIC INFORMATION

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 NNW

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.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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

Target Property County	FEMA Flood Electronic Data
HAWAII, HI	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 1551660885C

Additional Panels in search area: 1551660880C

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
HILO	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.

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.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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.

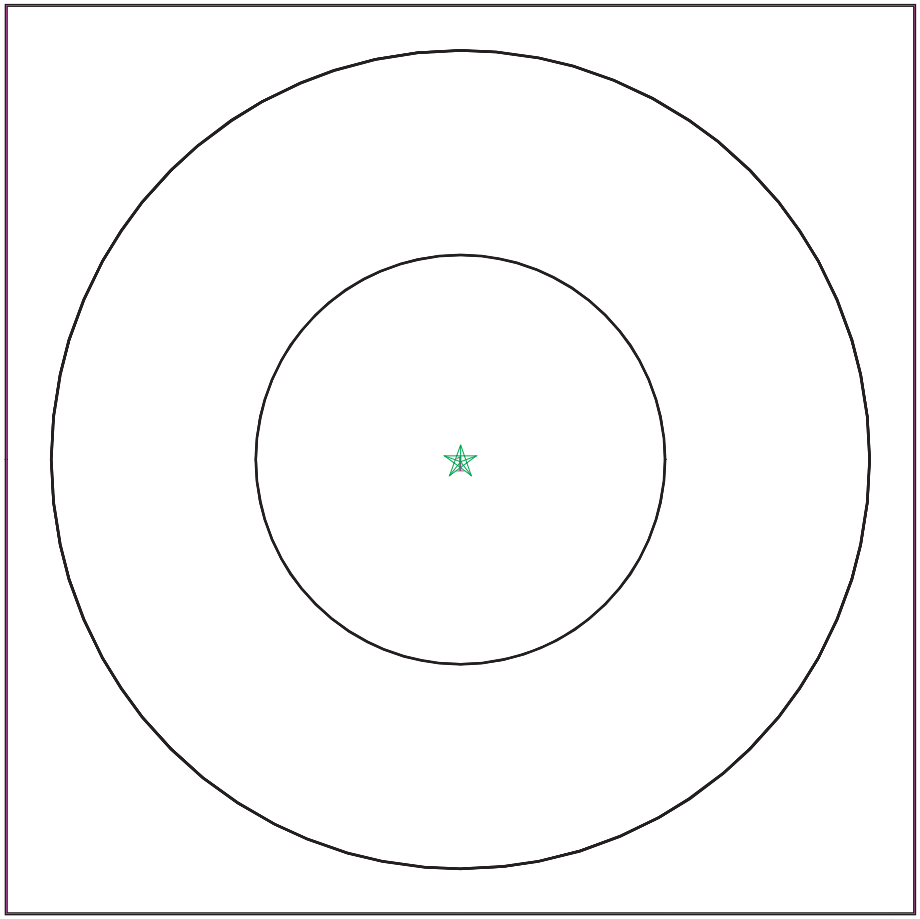
GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

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).

SSURGO SOIL MAP - 2300100.2s



SITE NAME: DHHL East Makaala	CLIENT: Group 70 International, Inc.
ADDRESS: Makaala Street	CONTACT: Dricka Brown
Hilo HI 96720	INQUIRY #: 2300100.2s
LAT/LONG: 19.7003 / 155.0595	DATE: August 21, 2008 10:36 am

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GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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: Papai

Soil Surface Texture: extremely stony muck

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 152 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information

	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	extremely stony muck	A-8	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel. COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel.	Max: 700 Min: 141.14	Max: Min:
2	7 inches	59 inches	extremely cobbly material	A-8	COARSE-GRAINED SOILS, Gravels, Clean gravels, Poorly Graded Gravel. COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel.	Max: 700 Min: 141.14	Max: Min:

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

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 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION 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
1	HI3000000000349	1/8 - 1/4 Mile ENE
A2	HI3000000000353	1/8 - 1/4 Mile North
A3	HI3000000000352	1/8 - 1/4 Mile NNW
A4	HI3000000000356	1/8 - 1/4 Mile North
A5	HI3000000000355	1/8 - 1/4 Mile NNW
A6	HI3000000000351	1/8 - 1/4 Mile NNW
A7	HI3000000000354	1/8 - 1/4 Mile NNW
B8	HI3000000000350	1/8 - 1/4 Mile NNW
A9	HI3000000000358	1/8 - 1/4 Mile NNW
B10	HI3000000000357	1/4 - 1/2 Mile NNW
C11	HI3000000000362	1/4 - 1/2 Mile NNW
C12	HI3000000000361	1/4 - 1/2 Mile NNW
C13	HI3000000000363	1/4 - 1/2 Mile North
D14	HI3000000000366	1/2 - 1 Mile North
D15	HI3000000000367	1/2 - 1 Mile North

PHYSICAL SETTING SOURCE MAP - 2300100.2s

- County Boundary
- Major Roads
- Contour Lines
- Airports
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location

SITE NAME: DHHL East Makaala	CLIENT: Group 70 International, Inc.
ADDRESS: Makaala Street	CONTACT: Dricka Brown
Hilo HI 96720	INQUIRY #: 2300100.2s
LAT/LONG: 19.7003 / 155.0595	DATE: August 21, 2008 10:36 am

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Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
1		
ENE	**HI WELLS**	**HI3000000000349**
1/8 - 1/4 Mile		
Lower		

Wid:	8-4203-015	Island:	8
Well no:	4203-15	Well name:	Waiakea
Old name:	Not Reported	Yr drilled:	1987
Driller:	ROSCOE MOSS	Quad map:	67
Longitude2:	1550336	Latitude27:	194216
Longitude8:	1550326	Latitude83:	194205
Lat83d:	19	Lat83m:	42
Lat83s:	05	Lon83d:	155
Lon83m:	03	Lon83s:	26
Lat83dd:	19.70139		
Lon83dd:	-155.05722		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	32	Lon83d 1:	194
Lon83m 1:	20	Lon83s 1:	5
Lat83dd 1:	15.84222		
Lon83dd 1:	-194.33472		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	32	Lon83d 12:	194
Lon83m 12:	20	Lon83s 12:	5
Lat83dd 12:	15.84222		
Lon83dd 12:	-194.33472		
Long83dd:	-155.05722		
Lat83dd 13:	19.70139		
Gps:	0	Utm:	1
Owner user:	Hawaiian Host	Old number:	Not Reported
Well type:	PER	Casing dia:	8
Ground el:	81	Well depth:	130
Solid case:	80	Perf case:	100
Use:	IND	Use year:	Not Reported
Init water:	8.8	Init head:	8.75000
Init chlor:	Not Reported		
Init cl:	21		
Test date:	########	Test gpm:	250
Test ddown:	0.0	Test chlor:	21
Test temp:	19.4	Temp unit:	C
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	Not Reported
Minchl yr:	0	Bot hole:	-49
Bot solid:	1	Bot perf:	-19
Spec capac:	Not Reported	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	########
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000349

A2		
North	**HI WELLS**	**HI3000000000353**
1/8 - 1/4 Mile		
Lower		

Wid:	8-4203-012	Island:	8
Well no:	4203-12	Well name:	Helco Kan 6-4
Old name:	Not Reported	Yr drilled:	1974
Driller:	WAT RES INTL	Quad map:	67
Longitude2:	1550346	Latitude27:	194222
Longitude8:	1550336	Latitude83:	194211
Lat83d:	19	Lat83m:	42
Lat83s:	11	Lon83d:	155
Lon83m:	03	Lon83s:	36
Lat83dd:	19.70306		
Lon83dd:	-155.06		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	1
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.35028		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	1
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.35028		
Long83dd:	-155.06		
Lat83dd 13:	19.70306		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	ROT	Casing dia:	30
Ground el:	49	Well depth:	210
Solid case:	80	Perf case:	Not Reported
Use:	INDEL	Use year:	74
Init water:	6.0	Init head:	6.00000
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	6000
Test ddown:	0.1	Test chlor:	Not Reported
Test temp:	Not Reported	Temp unit:	Not Reported
Pump gpm:	6250.00000	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	Not Reported
Minchl yr:	0	Bot hole:	-161
Bot solid:	-31	Bot perf:	Not Reported
Spec capac:	60000	Pump mgd:	9.000
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1974
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000353

A3
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000352**

Wid:	8-4203-010	Island:	8
Well no:	4203-10	Well name:	Hill Unit 6B
Old name:	Not Reported	Yr drilled:	1973
Driller:	WAT RES INTL	Quad map:	67
Longitude2:	1550347	Latitude27:	194222
Longitude8:	1550337	Latitude83:	194211
Lat83d:	19	Lat83m:	42
Lat83s:	11	Lon83d:	155
Lon83m:	03	Lon83s:	37
Lat83dd:	19.70306		
Lon83dd:	-155.06028		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	1
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.35028		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	1
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.35028		
Long83dd:	-155.06028		
Lat83dd 13:	19.70306		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	ROT	Casing dia:	32
Ground el:	55	Well depth:	210
Solid case:	75	Perf case:	Not Reported
Use:	INDEL	Use year:	74
Init water:	6.0	Init head:	6.00000
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	6100
Test ddown:	3.5	Test chlor:	Not Reported
Test temp:	20.0	Temp unit:	C
Pump gpm:	6250.00000	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	-155
Bot solid:	-20	Bot perf:	Not Reported
Spec capac:	1743	Pump mgd:	9.000
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1973
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000352

A4
North
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000356**

Wid:	8-4203-011	Island:	8
Well no:	4203-11	Well name:	Hill Unit 6C
Old name:	Not Reported	Yr drilled:	1974
Driller:	WAT RES INTL	Quad map:	67
Longitude2:	1550346	Latitude27:	194223
Longitude8:	1550336	Latitude83:	194212
Lat83d:	19	Lat83m:	42
Lat83s:	12	Lon83d:	155
Lon83m:	03	Lon83s:	36
Lat83dd:	19.70333		
Lon83dd:	-155.06		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	2
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.35056		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	2
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.35056		
Long83dd:	-155.06		
Lat83dd 13:	19.70333		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	DUG	Casing dia:	72
Ground el:	43	Well depth:	20
Solid case:	Not Reported	Perf case:	Not Reported
Use:	OTH	Use year:	Not Reported
Init water:	6.0	Init head:	6.00000
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	5800
Test ddown:	4.3	Test chlor:	Not Reported
Test temp:	Not Reported	Temp unit:	Not Reported
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	23
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	1349	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1974
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000356

A5
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000355**

Wid:	8-4203-009	Island:	8
Well no:	4203-09	Well name:	Hill Unit 6A
Old name:	Not Reported	Yr drilled:	1974
Driller:	WAT RES INTL	Quad map:	67
Longitude2:	1550347	Latitude27:	194223
Longitude8:	1550337	Latitude83:	194212
Lat83d:	19	Lat83m:	42
Lat83s:	12	Lon83d:	155
Lon83m:	03	Lon83s:	37
Lat83dd:	19.70333		
Lon83dd:	-155.06028		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	2
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.35056		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	2
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.35056		
Long83dd:	-155.06028		
Lat83dd 13:	19.70333		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	ROT	Casing dia:	32
Ground el:	55	Well depth:	210
Solid case:	Not Reported	Perf case:	Not Reported
Use:	INDEL	Use year:	74
Init water:	6.0	Init head:	6.00000
Init chlor:	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	Temp unit:	Not Reported
Pump gpm:	6250.00000	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	-155
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	9.000
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1974
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000355

A6
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000351**

Wid:	8-4203-005	Island:	8
Well no:	4203-05	Well name:	Hill Unit 5A
Old name:	Not Reported	Yr drilled:	1965
Driller:	LAYNE INTL	Quad map:	67
Longitude2:	1550350	Latitude27:	194222
Longitude8:	1550340	Latitude83:	194211
Lat83d:	19	Lat83m:	42
Lat83s:	11	Lon83d:	155
Lon83m:	03	Lon83s:	40
Lat83dd:	19.70306		
Lon83dd:	-155.06111		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	1
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35028		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	1
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35028		
Long83dd:	-155.06111		
Lat83dd 13:	19.70306		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	29
Ground el:	50	Well depth:	200
Solid case:	54	Perf case:	Not Reported
Use:	INDEL	Use year:	72
Init water:	Not Reported	Init head:	Not Reported
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	Not Reported
Test ddown:	Not Reported	Test chlor:	Not Reported
Test temp:	20.0	Temp unit:	C
Pump gpm:	4500.00000	Draft mgy:	2270
Head feet:	Not Reported	Max chlor:	28
Min chlor:	12	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	76
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	-150
Bot solid:	-4	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	6.480
Draft mgd:	6.2	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1965
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000351

A7
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000354**

Wid:	8-4203-006	Island:	8
Well no:	4203-06	Well name:	Hill Unit 5B
Old name:	Not Reported	Yr drilled:	1965
Driller:	LAYNE INTL	Quad map:	67
Longitude2:	1550349	Latitude27:	194223
Longitude8:	1550339	Latitude83:	194212
Lat83d:	19	Lat83m:	42
Lat83s:	12	Lon83d:	155
Lon83m:	03	Lon83s:	39
Lat83dd:	19.70333		
Lon83dd:	-155.06083		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	2
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.35056		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	2
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.35056		
Long83dd:	-155.06083		
Lat83dd 13:	19.70333		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	29
Ground el:	50	Well depth:	200
Solid case:	54	Perf case:	Not Reported
Use:	INDEL	Use year:	72
Init water:	6.5	Init head:	6.50000
Init chlor:	Not Reported		
Init cl:	0		
Test date:	Not Reported	Test gpm:	6500
Test ddown:	6.5	Test chlor:	Not Reported
Test temp:	19.9	Temp unit:	C
Pump gpm:	4500.00000	Draft mgy:	2270
Head feet:	Not Reported	Max chlor:	24
Min chlor:	11	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	76
Head yr:	Not Reported	Maxchl:	1/1/1975
Maxchl yr:	75	Minchl:	1/1/1976
Minchl yr:	76	Bot hole:	-150
Bot solid:	-4	Bot perf:	Not Reported
Spec capac:	1000	Pump mgd:	6.480
Draft mgd:	6.2	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1965
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000354

B8
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000350**

Wid:	8-4203-004	Island:	8
Well no:	4203-04	Well name:	Waiakea 4
Old name:	Not Reported	Yr drilled:	1961
Driller:	SAMSON-ZERBE	Quad map:	67
Longitude2:	1550351	Latitude27:	194222
Longitude8:	1550341	Latitude83:	194211
Lat83d:	19	Lat83m:	42
Lat83s:	11	Lon83d:	155
Lon83m:	03	Lon83s:	41
Lat83dd:	19.70306		
Lon83dd:	-155.06139		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	1
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35028		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	1
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35028		
Long83dd:	-155.06139		
Lat83dd 13:	19.70306		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	8-2
Well type:	PER	Casing dia:	16
Ground el:	47	Well depth:	201
Solid case:	60	Perf case:	Not Reported
Use:	ABNSLD	Use year:	72
Init water:	7.1	Init head:	7.06000
Init chlor:	22		
Init cl:	22		
Test date:	########	Test gpm:	2500
Test ddown:	0.2	Test chlor:	40
Test temp:	20.0	Temp unit:	C
Pump gpm:	Not Reported	Draft mgy:	25
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	63
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	Not Reported
Minchl yr:	0	Bot hole:	-154
Bot solid:	-13	Bot perf:	Not Reported
Spec capac:	12500	Pump mgd:	Not Reported
Draft mgd:	0.1	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	########
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000350

A9
NNW
1/8 - 1/4 Mile
Lower

HI WELLS **HI3000000000358**

Wid:	8-4203-007	Island:	8
Well no:	4203-07	Well name:	Hill Unit 5C
Old name:	Not Reported	Yr drilled:	1965
Driller:	LAYNE INTL	Quad map:	67
Longitude2:	1550350	Latitude27:	194224
Longitude8:	1550340	Latitude83:	194213
Lat83d:	19	Lat83m:	42
Lat83s:	13	Lon83d:	155
Lon83m:	03	Lon83s:	40
Lat83dd:	19.70361		
Lon83dd:	-155.06111		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	3
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35083		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	3
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35083		
Long83dd:	-155.06111		
Lat83dd 13:	19.70361		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	29
Ground el:	50	Well depth:	585
Solid case:	200	Perf case:	Not Reported
Use:	INDEL	Use year:	72
Init water:	Not Reported	Init head:	Not Reported
Init chlor:	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	Temp unit:	Not Reported
Pump gpm:	4500.00000	Draft mgy:	1513
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	76
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	Not Reported
Minchl yr:	0	Bot hole:	-535
Bot solid:	-150	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	6.480
Draft mgd:	4.1	Aquifer:	80401
Tmk:	2-2-058:019	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1965
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000358

B10
NNW
1/4 - 1/2 Mile
Lower

HI WELLS **HI3000000000357**

Wid:	8-4203-002	Island:	8
Well no:	4203-02	Well name:	Waiakea TH 2
Old name:	Not Reported	Yr drilled:	1960
Driller:	SAMSON-ZERBE	Quad map:	67
Longitude2:	1550352	Latitude27:	194223
Longitude8:	1550342	Latitude83:	194212
Lat83d:	19	Lat83m:	42
Lat83s:	12	Lon83d:	155
Lon83m:	03	Lon83s:	42
Lat83dd:	19.70333		
Lon83dd:	-155.06167		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	2
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35056		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	2
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35056		
Long83dd:	-155.06167		
Lat83dd 13:	19.70333		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	5
Ground el:	41	Well depth:	55
Solid case:	Not Reported	Perf case:	Not Reported
Use:	UNU	Use year:	Not Reported
Init water:	9.1	Init head:	9.10000
Init chlor:	6		
Init cl:	6		
Test date:	Not Reported	Test gpm:	50
Test ddown:	0.6	Test chlor:	6
Test temp:	21.1	Temp unit:	C
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	-14
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	83	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1960
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000357

C11
NNW
1/4 - 1/2 Mile
Lower

HI WELLS **HI3000000000362**

Wid:	8-4203-008	Island:	8
Well no:	4203-08	Well name:	Kanoelehua Disp
Old name:	Not Reported	Yr drilled:	1965
Driller:	LAYNE INTL	Quad map:	67
Longitude2:	1550350	Latitude27:	194228
Longitude8:	1550340	Latitude83:	194217
Lat83d:	19	Lat83m:	42
Lat83s:	17	Lon83d:	155
Lon83m:	03	Lon83s:	40
Lat83dd:	19.70472		
Lon83dd:	-155.06111		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	7
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35194		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	7
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35194		
Long83dd:	-155.06111		
Lat83dd 13:	19.70472		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	DUG	Casing dia:	192
Ground el:	39	Well depth:	33
Solid case:	8	Perf case:	Not Reported
Use:	OTH	Use year:	72
Init water:	Not Reported	Init head:	Not Reported
Init chlor:	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	Temp unit:	Not Reported
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	6
Bot solid:	31	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1965
Pir:	Not Reported	Surveyor:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000362

C12
NNW
1/4 - 1/2 Mile
Lower

HI WELLS **HI3000000000361**

Wid:	8-4203-001	Island:	8
Well no:	4203-01	Well name:	Waiakea TH 1
Old name:	Not Reported	Yr drilled:	1960
Driller:	SAMSON-ZERBE	Quad map:	67
Longitude2:	1550353	Latitude27:	194228
Longitude8:	1550343	Latitude83:	194217
Lat83d:	19	Lat83m:	42
Lat83s:	17	Lon83d:	155
Lon83m:	03	Lon83s:	43
Lat83dd:	19.70472		
Lon83dd:	-155.06194		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	34	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	7
Lat83dd 1:	15.84278		
Lon83dd 1:	-194.35194		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	34	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	7
Lat83dd 12:	15.84278		
Lon83dd 12:	-194.35194		
Long83dd:	-155.06194		
Lat83dd 13:	19.70472		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	5
Ground el:	40	Well depth:	54
Solid case:	Not Reported	Perf case:	Not Reported
Use:	UNU	Use year:	Not Reported
Init water:	6.7	Init head:	6.70000
Init chlor:	4		
Init cl:	4		
Test date:	Not Reported	Test gpm:	36
Test ddown:	1.0	Test chlor:	6
Test temp:	21.1	Temp unit:	C
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	Not Reported	Minchl:	Not Reported
Minchl yr:	Not Reported	Bot hole:	-14
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	36	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1960
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000361

C13
North
1/4 - 1/2 Mile
Lower

HI WELLS **HI3000000000363**

Wid:	8-4203-003	Island:	8
Well no:	4203-03	Well name:	Waiakea TH 3
Old name:	Not Reported	Yr drilled:	1960
Driller:	SAMSON-ZERBE	Quad map:	67
Longitude2:	1550348	Latitude27:	194230
Longitude8:	1550338	Latitude83:	194219
Lat83d:	19	Lat83m:	42
Lat83s:	19	Lon83d:	155
Lon83m:	03	Lon83s:	38
Lat83dd:	19.70528		
Lon83dd:	-155.06056		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	21	Lon83s 1:	9
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.3525		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	21	Lon83s 12:	9
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.3525		
Long83dd:	-155.06056		
Lat83dd 13:	19.70528		
Gps:	0	Utm:	1
Owner user:	HELCO	Old number:	Not Reported
Well type:	Not Reported	Casing dia:	5
Ground el:	41	Well depth:	56
Solid case:	Not Reported	Perf case:	Not Reported
Use:	OTH	Use year:	Not Reported
Init water:	5.8	Init head:	5.80000
Init chlor:	4		
Init cl:	4		
Test date:	Not Reported	Test gpm:	50
Test ddown:	0.2	Test chlor:	8
Test temp:	21.1	Temp unit:	C
Pump gpm:	Not Reported	Draft mgy:	Not Reported
Head feet:	Not Reported	Max chlor:	Not Reported
Min chlor:	Not Reported	Geology:	QKL
Pump yr:	Not Reported	Draft yr:	Not Reported
Head yr:	Not Reported	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	Not Reported
Minchl yr:	0	Bot hole:	-15
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	250	Pump mgd:	Not Reported
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	Not Reported
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1960
Pir:	Not Reported	Surveyor:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000363

D14
North
1/2 - 1 Mile
Lower

HI WELLS **HI3000000000366**

Wid:	8-4203-013	Island:	8
Well no:	4203-13	Well name:	Glover Quarry A
Old name:	Not Reported	Yr drilled:	1948
Driller:	JAS GLOVER	Quad map:	67
Longitude2:	1550344	Latitude27:	194244
Longitude8:	1550334	Latitude83:	194233
Lat83d:	19	Lat83m:	42
Lat83s:	33	Lon83d:	155
Lon83m:	03	Lon83s:	34
Lat83dd:	19.70917		
Lon83dd:	-155.05944		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	23	Lon83s 1:	3
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.38417		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	23	Lon83s 12:	3
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.38417		
Long83dd:	-155.05944		
Lat83dd 13:	19.70917		
Gps:	0	Utm:	1
Owner user:	Jas W Glover Ltd	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:	INDMI	Use year:	84
Init water:	Not Reported	Init head:	Not Reported
Init chlor:	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	Temp unit:	Not Reported
Pump gpm:	600.00000	Draft mgy:	Not Reported
Head feet:	3.0	Max chlor:	13
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	84	Draft yr:	Not Reported
Head yr:	83	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	1/1/1983
Minchl yr:	0	Bot hole:	-2
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	.864
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	3.00000
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1948
Pir:	Not Reported	Surveyor:	Not Reported

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000366

D15
North
1/2 - 1 Mile
Lower

HI WELLS **HI3000000000367**

Wid:	8-4203-014	Island:	8
Well no:	4203-14	Well name:	Glover Quarry B
Old name:	Not Reported	Yr drilled:	1948
Driller:	JAS GLOVER	Quad map:	67
Longitude2:	1550342	Latitude27:	194245
Longitude8:	1550332	Latitude83:	194234
Lat83d:	19	Lat83m:	42
Lat83s:	34	Lon83d:	155
Lon83m:	03	Lon83s:	32
Lat83dd:	19.70944		
Lon83dd:	-155.05889		
Lat83d 1:	15	Lat83m 1:	50
Lat83s 1:	33	Lon83d 1:	194
Lon83m 1:	23	Lon83s 1:	4
Lat83dd 1:	15.8425		
Lon83dd 1:	-194.38444		
Lat83d 12:	15	Lat83m 12:	50
Lat83s 12:	33	Lon83d 12:	194
Lon83m 12:	23	Lon83s 12:	4
Lat83dd 12:	15.8425		
Lon83dd 12:	-194.38444		
Long83dd:	-155.05889		
Lat83dd 13:	19.70944		
Gps:	0	Utm:	1
Owner user:	Jas W Glover Ltd	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:	INDMI	Use year:	84
Init water:	Not Reported	Init head:	Not Reported
Init chlor:	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	Temp unit:	Not Reported
Pump gpm:	350.00000	Draft mgy:	Not Reported
Head feet:	3.0	Max chlor:	13
Min chlor:	Not Reported	Geology:	Not Reported
Pump yr:	84	Draft yr:	Not Reported
Head yr:	84	Maxchl:	Not Reported
Maxchl yr:	0	Minchl:	1/1/1983
Minchl yr:	0	Bot hole:	-2
Bot solid:	Not Reported	Bot perf:	Not Reported
Spec capac:	Not Reported	Pump mgd:	.504
Draft mgd:	Not Reported	Aquifer:	80401
Tmk:	Not Reported	Old aqui:	Not Reported
Aqui code:	80401	Latest hd:	3.00000
Cur head:	Not Reported	Cur cl:	Not Reported
Cur temp:	Not Reported	Wcr:	1/1/1948
Pir:	Not Reported	Surveyor:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

T:	Not Reported	Pump elev:	Not Reported
Pump depth:	Not Reported	Site id:	HI3000000000367

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

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%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

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.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} 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 Services
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 Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, 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.

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: Department of Land and Natural Resources
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

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STREET AND ADDRESS INFORMATION

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DHHL East Makaala
Makaala Street
Hilo, HI 96720

Inquiry Number: 2300100.4
August 21, 2008

The EDR Historical Topographic Map Report

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

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

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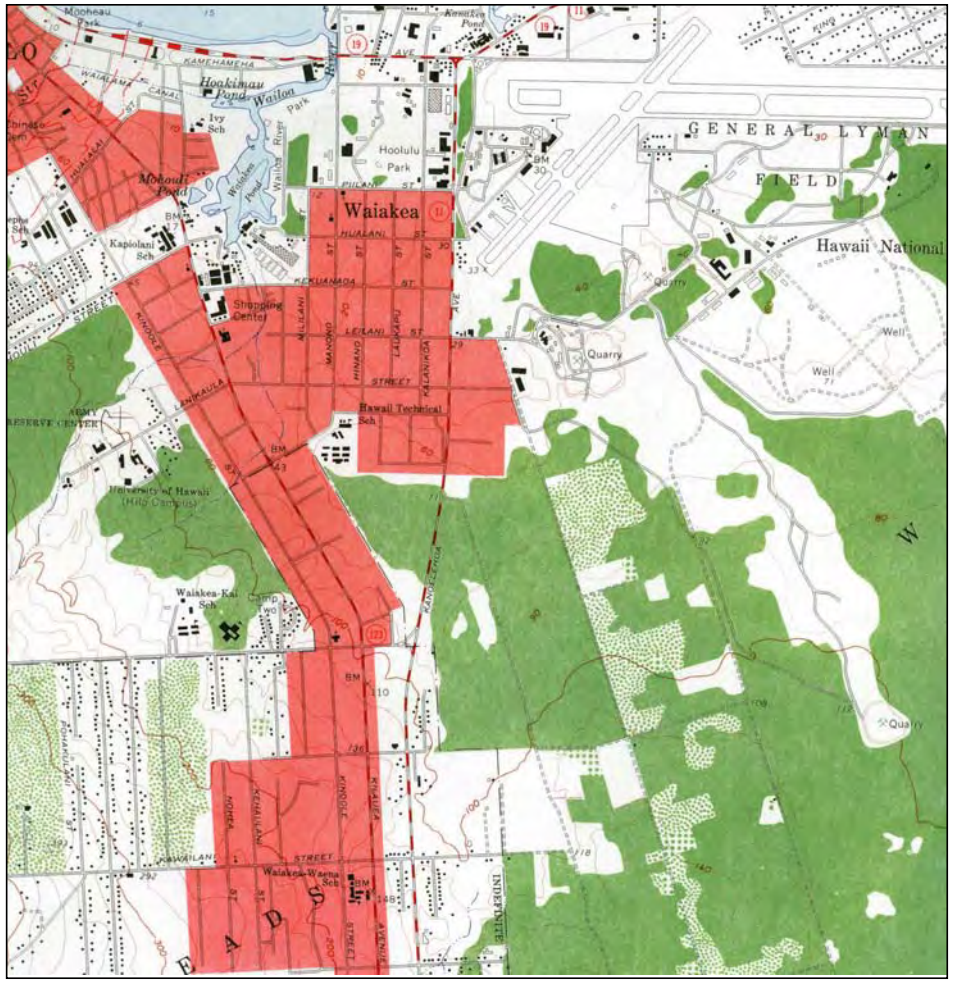
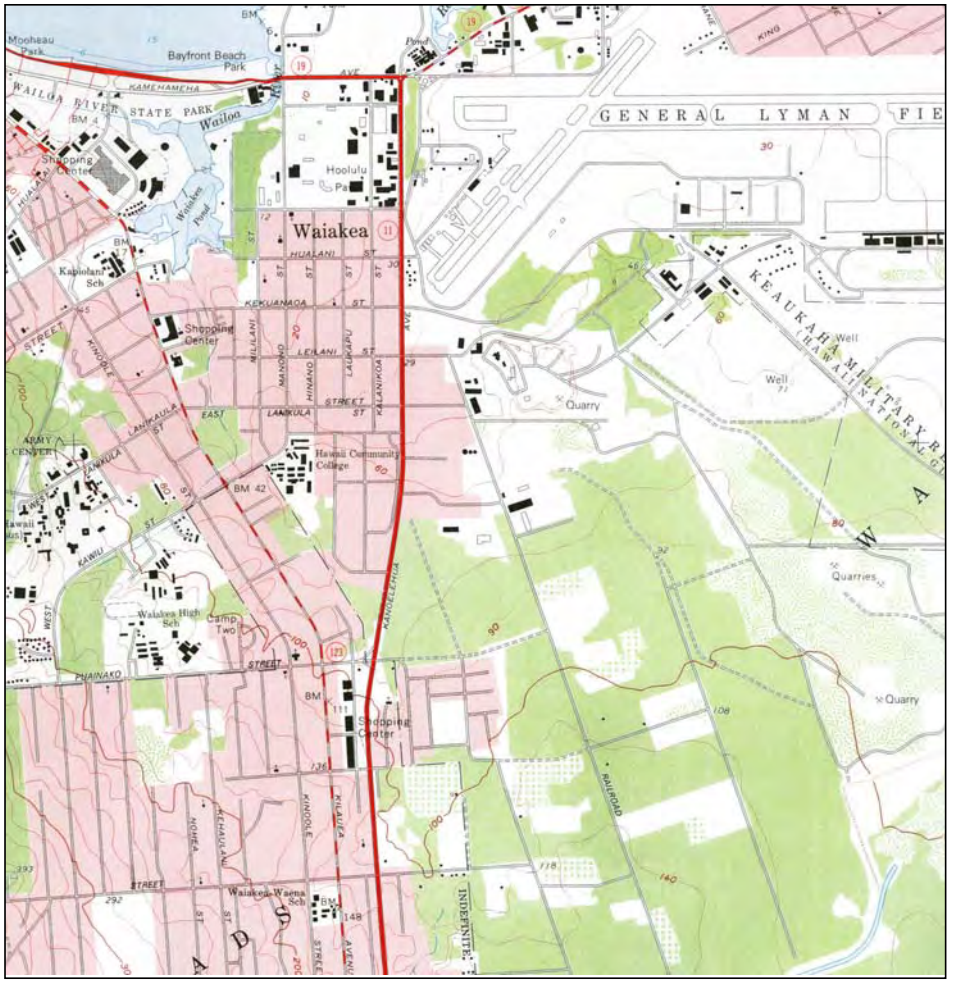
Historical Topographic Map



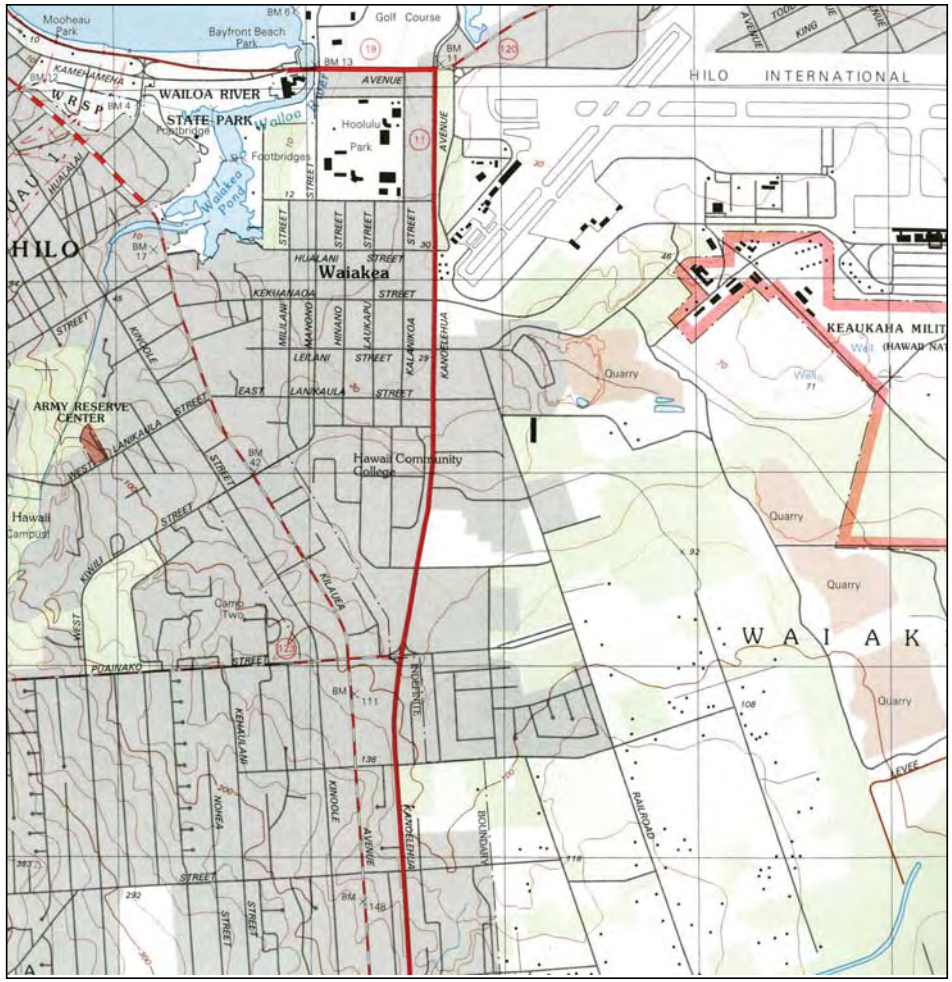
N	TARGET QUAD NAME: Hilo, HI MAP YEAR: 1963 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: DHHL East Makaala ADDRESS: Makaala Street Hilo, HI 96720 LAT/LONG: 19.7003 / 155.06	CLIENT: Group 70 International, Inc. CONTACT: Dricka Brown INQUIRY#: 2300100.4 RESEARCH DATE: 08/21/2008

Historical Topographic Map



N	TARGET QUAD NAME: Hilo, HI MAP YEAR: 1981 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: DHHL East Makaala ADDRESS: Makaala Street Hilo, HI 96720 LAT/LONG: 19.7003 / 155.06	CLIENT: Group 70 International, Inc. CONTACT: Dricka Brown INQUIRY#: 2300100.4 RESEARCH DATE: 08/21/2008

Historical Topographic Map



N	TARGET QUAD NAME: Hilo, HI MAP YEAR: 1995 SERIES: 7.5 SCALE: 1:24,000	SITE NAME: DHHL East Makaala ADDRESS: Makaala Street Hilo, HI 96720 LAT/LONG: 19.7003 / 155.06	CLIENT: Group 70 International, Inc. CONTACT: Dricka Brown INQUIRY#: 2300100.4 RESEARCH DATE: 08/21/2008

DHHL East Makaala
Makaala Street
Hilo, HI 96720

Inquiry Number: 2300100.3
August 21, 2008

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

8/21/08

Site Name:
DHHL East Makaala
Makaala Street
Hilo, HI 96720

Client Name:
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, HI 96740

EDR Inquiry # 2300100.3

Contact: Dricka Brown

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Group 70 International, Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: DHHL East Makaala
Address: Makaala Street
City, State, Zip: Hilo, HI 96720
Cross Street:
P.O. # 28054-01; 02
Project: DHHL East Makaa
Certification # 2D75-47E4-9596

Sanborn® Library search results
Certification # 2D75-47E4-9596

UNMAPPED PROPERTY

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

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

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

Total Maps: 0

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APPENDIX B. GOVERNMENT RECORDS

9/20/07 Records Review: DHHL E. Makaala

DOH SHWB

30 Kukila Street - Divaco Cooperative (MS Auto, Inc.)

UST closure report dated 8/2005

UST Closure Report → prepared by Walker Consultants, Ltd. (CA)

prepared for D.L. Downing GC, Inc.

reccomendation → No Futher Action (NFA)

GW not encountered during UST excavation - excavation extended to 14' bgs.

H2O table estimated to be @ 70' bgs.

UST's were out of service since '99

prev. DOH records indicate 2 original 4,000 gallon gasoline USTs on site from 1/74 → 12/92

"most likely" in location from recently removed USTs as it is rare in most Hilo to make a new excavation into hard lava for replacement of UST's - however no readily-available information regarding these UST's - DOH records simply indicate past presence.

- No visuals/olfactory evidence observed during removal (no soil discoloration or petroleum odors)

- No Gasoline detected in soil samples from under former UST

10 samples collected - 5 soil samples analyzed for: TPH-G, BTEX, & MTBE. 5 stockpile soil samples collected but not analyzed following DOH guidance as no TPH-G, BTEX, or MTBE was detected in UST soil area samples / dispenser samples.

NFA reccommended - based on field observations & samples collected.

PID also used <0.1 ppm → 2.4 ppmv

part per million volumetric

PID detection limit is 0.1 ppmv.

DOH criteria ≤ less than 500 ppmv

(2)

DOH letter dated 2/22/06

* No Futher Action letter

"No Futher Work" is necessary regarding UST system removed from site."

requested copy

50 Kukila St. Akana Petroleum

3 tanks in '88

all 10157 gallons × 3 tanks → Gasoline

last inspection documented by George Tabil 11/30/04

Notice of inspection submitted to DOH

tanks still present.

Field Citation issued by DOH 2/11/05 due to violations inspected.

However → DOH letter to Thomas E. Arizumi, P.E., Chief Env. Management Division from Steven Y.K. Chang P.E., Chief SHWB dated 11/16/07 states "Field Citation issued on 2/11/05 was automatically withdrawn, pursuant to HAR section 11-281-126(d). In recent review, DOH determined that it will not pursue formal enforcement against Akana Petrol. regarding violations cited in Field Citation No. 2583

also have used oil tank on site for storage of used oil - no documentation of violations.

Reccommendation: No Futher Action

(3)

M. Sonomura Contracting Co., Inc

100 Kukila St.

DOH Haz. Waste Activity Notification Form dated 1/14/94 declaring property is a generator of less than 100 kg/mo (220 lbs) = [Conditionally - Exempt Small Quantity Generator] SQG

Waste reported as Ignitable (D001)

EPA Notification of Haz Waste Activity 2/15/89

less than <100 1,000 kg/mo Conditionally Exempt SQG

copy of letter from EPA → Sonomura: 2/7/89

after visual inspection business generates approximately 13 gallons of haz. waste solvent per month. Waste solvent is handled by "Safety Kleen".

Signed Arlene M. Kabei, Manager Haz. Waste Program

Env. Assessment Report - by UNITEK for UST Tank System Closure

For M. Sonomura Contraction; 100 Kukila Street

December 29, 1993

limited investigation designed to document condition of soil in vicinity of 3 USTs previously removed. 2 were 550 gal steel gasoline tanks, 3rd was 1,000 gal UST diesel fuel tank. Tanks used to fuel co. vehicles.

PID used = 0 → 13.8 ppm above background levels. No staining or olfactory indications of petroleum hydrocarbon release.

UST's installed 1970 - removed in 1990's

(4)

according to HI DOH Technical Guidance Manual (TGM) for closure of UST's criteria for identifying contaminated soil using organic vapor readings is 50 ppm diesel and 500 ppm for gasoline (DOH, 1992)

PID measured 0 ppm → 13.8 ppm

results of lab analysis on soil samples from UST excavation indicated non-detectable levels of TPH-G TPH-as diesel, BTE, and total lead

BTE (Benzene, Toluene, ethylbenzene)

WATEK rec: NFA.

State DOH letter - Env. Management Division to M. Sonomera contracting dated 3/15/1994

copy requested

Subject: Review of EA for M. Sonomera 100 Kukila St. 12/29/1993

- "no further investigation of former USTs is necessary"

additional info requested to complete UST closure.

(5)

66 Kukila St. Hilo Wood Treating, Inc.

1 UST - 1,000 gallon in '86

DOH letter dated 10/22/90: informing of requirements to comply w/ release detection requirements as of 12/22/88. DOH requested Hilo Wood Treating "self-certify" compliance w/ federal release detection requirements for tanks whose age & unknown / installed between 1965-1969.

U.S. EPA letter dated 6-10-96 regarding:

Possibility of Deed notification for Hilo

" called Hilo Chamber of Commerce - is their some local provisions for "red-flagging" a deed to inform prospective buyers about soil conditions

EPA 5/30/96 letter

Subject: Risk Management Decision Team (RMDT)

RMDT Recommendation:

"request president of Hilo Wood Treating to inform adjacent property owners that past releases from facility have contaminated their property

DHH owns adjacent vacant prop to the South of the facility

Suggested sampling soil

Possible contaminants — arsenic, chromium, copper

no immediate action rec for investigation of GW - nearest drinking H2O supply is 2 miles up gradient.

(6)

pentachlorophenol used on site 1969-1973

HWT ↳ dry wells south of property for stormwater runoff collection.

U.S. EPA 10/3/1997

Consent Agreement & Consent Order contains terms of settlement reached w/ Office of Regional Counsel, Matt Strassberg

" cover w/ an asphalt-concrete cap all uppaved areas" to prevent spread

6/4/97 DHHL letter to SHWB 6/4/97

- thanking for discussion on how DHHL should handle HWT situation

DOH 2007 Hazardous Waste Report

2/14/08 Exemption Form

Site is not a RCRA LQG in 2007

Site did not treat, store, or dispose of RCRA haz waste in 2007

10/87 "Work Plan for the Recycle of Wood Treating Wash Water"

Prep'd by: Keystone Env. Resources, Inc. Penn.

Work plan for recycling of 37 55-gallon drums of tribucide wash water.

(7)

HWT is a wood preserving co. constructed in 1968 in Hilo. Had used Copper Chromated Arsenate (CCA) and BTS (Bis) (trin-butyltin) oxide (TBTO) wood treating processes. Used to pressure treat.

process had been replaced by use of dip tank & CCA treatment using cylinder continued.

- water sampled contained 2% solids & high content of oil

recycle options: Filtration / oil/water separation / Flocculation.

10/1987 Health & Safety Plan for the recycle of Wood Treating Wash Water

Prep'd for: HWT

Pred by: Keystone Env. Resources Inc.

prepared for personnel on site during recycling of wash water.

compounds of concern: tributyltin oxide, tribucide, chromated, copper, arsenic, and chevron thinner 325.

10/1995 EPA letter to HWT

"based on most recent report on sampling & analysis by Levine-Fricke, EPA has determined that it is necessary to conduct further sampling @ HWT site. Need to determine more accurately the depth of contamination before effective remediation plan can be developed.

(8)

letters re: drip pad management standard. 1993/1991

4/7/82 RCRA ~~Notification~~ notifier Facility Investigation
HWT & EPA submittal letter for report

7/1996 U.S. EPA letter to DHHL
re: EPA enforcement action against HWT
chromated copper Arsenate (CCA) = Haz. waste
release of contaminants noted in '93 particularly around drip pad (which @ that date had no berm)
Sampling 94, 95 – indicated several "hot spots" for arsenic above PRG levels.
all but 1 sample tested below TCLP for copper, chromium, & arsenic.
depth of sampling go → 4' bgs

requested copy

Facility has since switched to using sodium borate which is not a RCRA regulated substance as CCA works.

"Surface H2O flows from main/upper lot south into the leased lower lot and then to the north-eastern portion of lower lot. Then into dry well located a few feet off site."

(9)

5/4/94 Penalty – $199K – USEPA Region IX to HWT
RCRA 09-04-0007
Determination of violation, compliance order, and notice of Right to Request Hearing

○ who may I talk to about Hilo Wood Treating Co.?
Call & ask for Roxanne Richard.

9/9/08 HEER Office
95 Pohaku St. Hilo HI 96720
GTE Hilo Warehouse / Verizon Hawaii
→ they have gasoline on site. → 4,000 Gallon UST for Co. vehicles
HEPRA – Hilo warehouse
04 1/05 Tier II Emergency & Haz. Chemical Inventory 1/28/05
2/05 Gasoline, unleaded 2/18/05
Chemical Inventory Federal Tier II reports.

30 Kukila Street – Divaco Cooperatives

3/98 Chemical Inv. Fed. Tier II Form
Chem. name = Gramoxone Extra
EHS = Paraquat Dichloride
Site has chemical

50 Kukila Street, Akana Petroleum

MSDS sheets
Tier II chem Inventory forms. 2000 '99, '98, '97, '96, '95, '94, '88

requested copy

figure depicting site plan showing portions of HHL of Panaewa @ Waiakea

correspondence of HEPCRA filling fee payments & Tier II submittals.

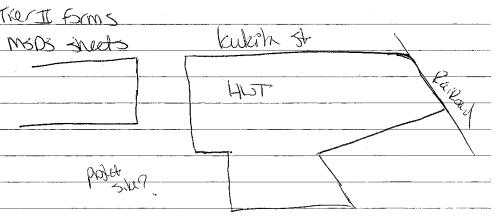
100 Kukila Street, M. Sonomura Contracting Co. Inc.

Wailoa River bridge construction site
Release – Wailoa River Hydraulic Spill, M. Sonomura Contracting
30 gallons hydraulic oil
○ Mega Pump of Hawaii hired to conduct complete clean up of affected area.

U.S. Coast Guard Marine Safety Office Honolulu
Pollution Notification sheet
– 8/25/'92
20–30 gallons hydraulic oil – "clean up taking place @ this time".
→ While installing footing for bridge hydraulic line
8/25/92 ruptured underwater & oil released into river.
Heavy equipment was removed from stream, solvents & booms used, Mega Pump of Hawaii hired to suck Hydraulic oil.
response → NFA DOH & USCG inspected – clean up completed satisfactorily & proceeded to close case.

66 Kukila Street Hilo – Hilo Wood Treating Inc.

Tier II forms
MSDS sheets



7/27/94 "Proposal Work order for Env. Consulting Services @ Hilo Wood Treating Inc."
by: LEVINE · FRICKE

EPA's immediate concern – potential for chemical impact by CCA runoff from the drip pad.
– Proposal to perform preliminary evaluation of CCA impacted soil in the immediate vicinity of the drip pad.

9/1/94 "Preliminary Surface-Soil Investigation Report Hilo Wood Treating, Inc."
by: LEVINE · FRICKE

Recommendations: Additional surface & near surface soil samples should be collected to better evaluate the vertical & horizontal extent of chromium, copper, and arsenic above background levels in vicinity of drip pad, pressure release valve, and treatment tank.

4/4/95 "Revised Sampling and Analysis Plan, HWT, Inc."
by LEVINE · FRICKE

EPA subsequently requested changes to preliminary report which EPA now refers to as Sampling and Analysis Plan (SAP).
– This document incorporated EPA's requested changes & was submitted to EPA for review & approval.
rec still → additional surface & near surface soil samples should be collected to determine/evaluate extent of vertical & horizontal extent of chromium, copper, and arsenic above background levels in vicinity of the drip pad, pressure release valve, and treatment tank.

7/18/1995 "Results of June 26, 1995 Sampling and 1995/1996 Scope of Work" Hilo Wood Treating Inc."
by: LEVINE – FRICKE

due to HWT financial situation legal proceedings enforcement action will remain on hold so long as HWT economic condition remains poor and investigation and remediation progress continues on site. SOW calls for work to be performed in stages as HTW financial ability to perform work is limited.

action: Excavated Trenches for soil sample collection
· 8 samples collected on 6/26/95 HT-10 & HT-18

analyses of samples
(less than 0.5' bgs) surface samples chromium concentration 45 mg/kg to 950 mg/kg; total copper 71 mg/kg – 640 mg/kg; total arsenic 19 mg/kg to 1400 mg/kg; hexavalent chromium 3 mg/kg to 20 mg/kg.

Soil samples 4' bgs: chromium 18 mg/kg to 610 mg/kg; total copper 47 mg/kg → 840 mg/kg; total arsenic was nondetect mg/kg to 1900 mg/kg; hexavalent chromium 3 mg/kg → 7 mg/kg.

background samples HT-17 & HT-18
indicated presence of chromium, copper, arsenic, & hexavalent chromium at detectable concentrations.

SOW proposed for 1995 & 1996 in stages
$65,000 $40,000

1995 install soil borings for sample collection @ 5 locations & at an on-site upgradient location. Samples to be collected @ each boring @ 5' intervals to a total depth of 20 bgs.

2/5/97 EPA letter to HI DOH-SHWB – Risk Management Team
"Virtually the entire HWT property is contaminated
↳ Arsenic above EPA IX preliminary Remediation Goals (PRGs)

1996 – SOW – based on results of sampling/previous investigations @ site, plan will be developed & implemented to excavate soil found to contain high levels of copper, chromium & arsenic beneath pressure treating cylinder, est. that 10 yd³ will be removed. Once excavation completed – 5 samples will be collected to evaluate residual levels of materials if any.

1996 "Field sampling report (log) HWT surface soil sampling 9/17–9/18 1996"
* stapled to report – does not say who performed
↳ Sampling Log w/ soil sampling locations

3/14/97 DOH letter to Mr. Mike Ardito U.S. EPA
Submit HWT as a deliverable PA/SI for FY97-98.
Site is under enforcement action by EPA RCRA program for Arsenic contamination also newly discovered pentachlorophenol contamination, due to lack of funds by facility operator –
DOH would like to conduct preliminary investigation

10/29/97 DOH letter to EPA
HWT currently being administered by EPA RCRA enforcement section w/o deferral from section cannot be investigated under CERCLA. cannot be a FY98 PA/SI

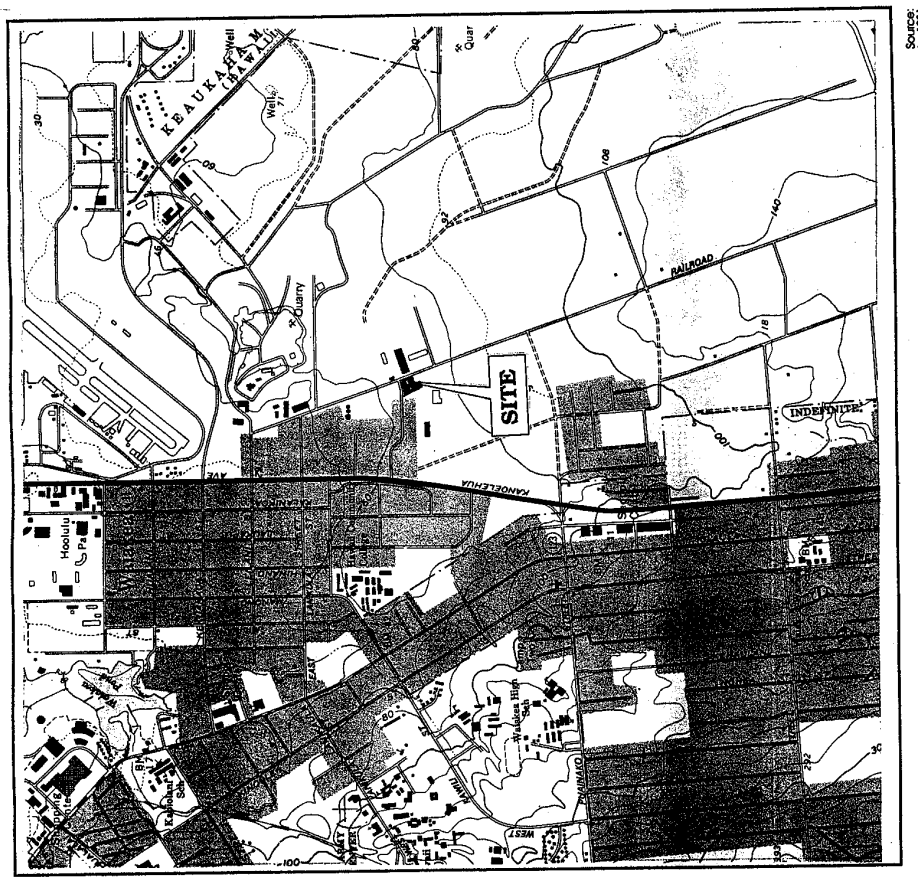


Figure 1 : SITE LOCATION MAP

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Figure 3 : LOCATIONS OF PROPOSED SOIL SAMPLING AND SURFACE SOIL SAMPLES COLLECTED ON AUGUST 8, 1994

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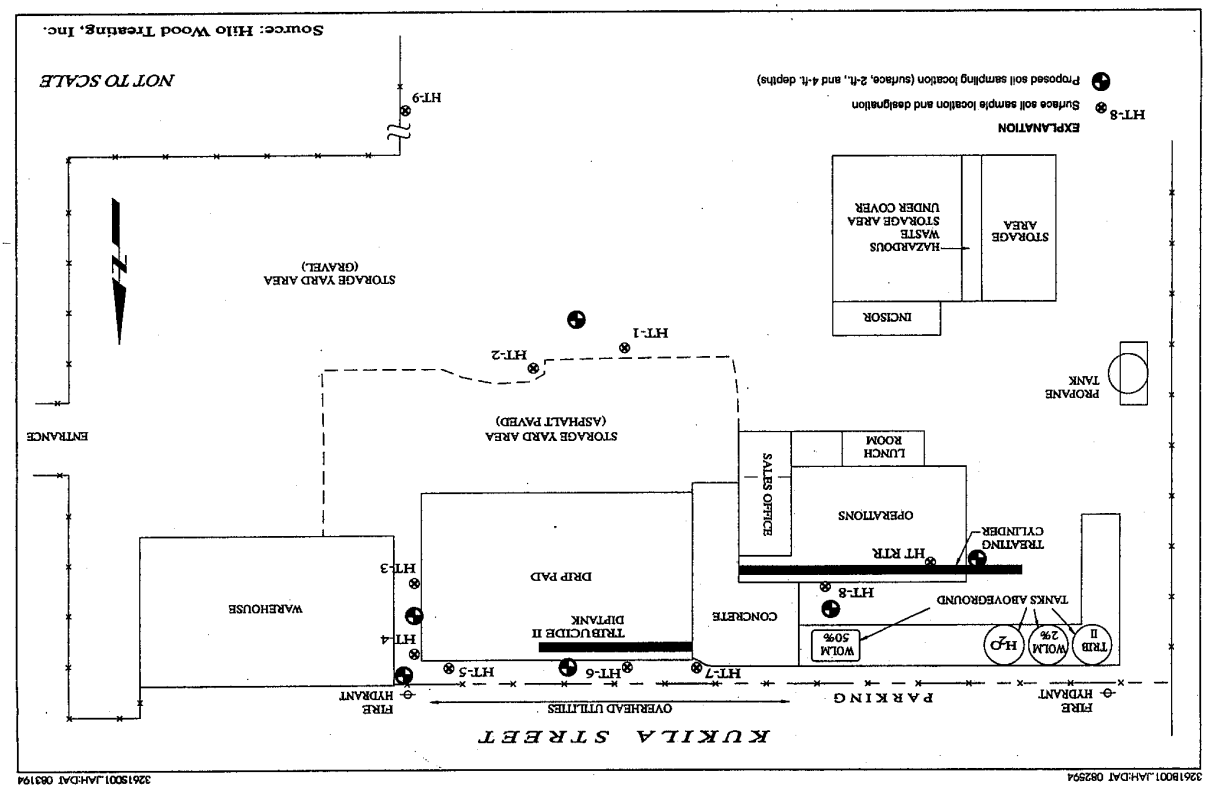

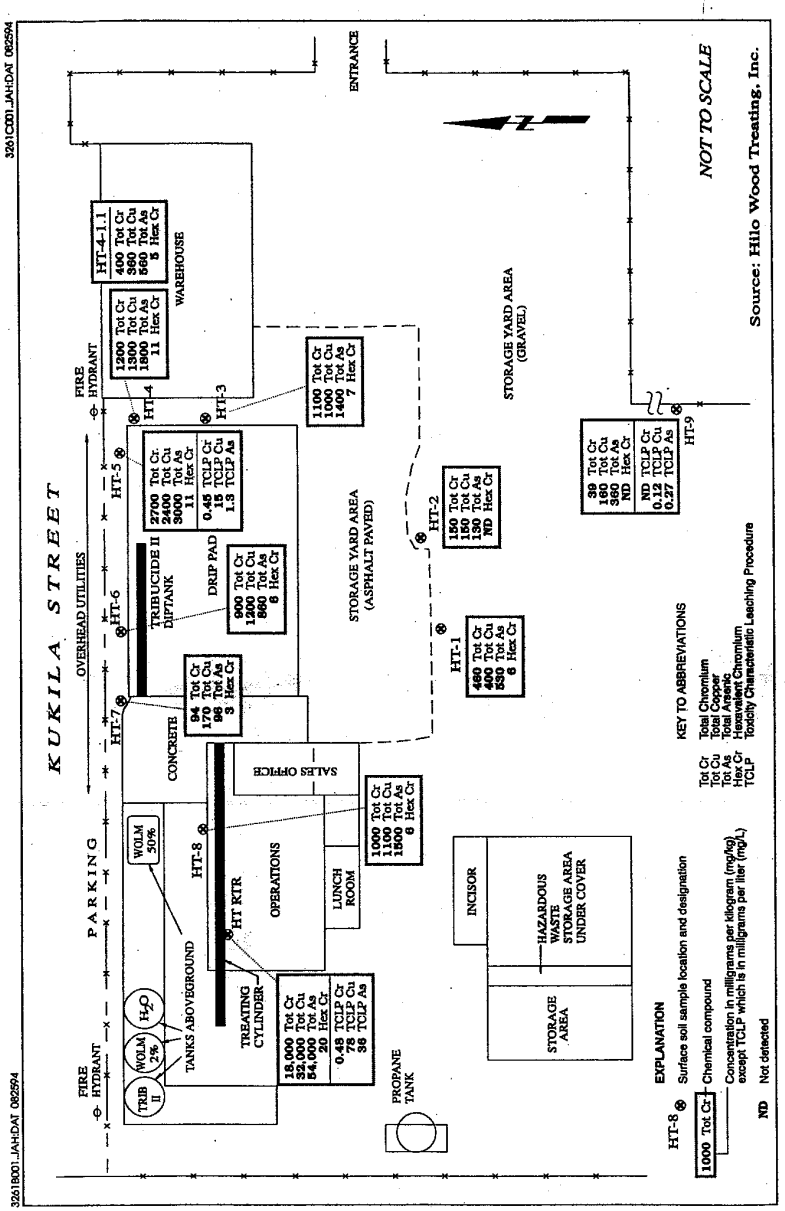

Figure 2 : LOCATIONS OF SURFACE SOIL SAMPLES COLLECTED ON AUGUST 8, 1994 AND RESULTS OF LABORATORY ANALYSIS

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Project No. 3261

1.0 BACKGROUND

Hilo Wood Treating, Inc. operates a wood treating facility at 66 Kukila Street in Hilo, Hawaii (Figure 1). The facility began operations in 1967, and in November 1980 received approval as a hazardous waste generator (HID 044011278).

Levine•Fricke understands that the State of Hawaii, Department of Health (DOH) conducted a Resource Conservation and Recovery Act (RCRA) Compliance Evaluation Inspection of the facility in September 1993. The DOH inspectors reported that the facility drip pad did not conform to regulatory standards and that discharge of chromated copper arsenate (CCA) to surrounding soil had occurred.

Hilo Wood Treating, Inc. was subsequently issued a Determination of Violation, Compliance Order, and Notice to Request a Hearing (Complaint, No. 09-94-0007 [dated May 4, 1994]) by the U. S. Environmental Protection Agency (EPA) on the basis of the findings of the DOH inspection. The Complaint consisted of a single count for the "disposal and storage of hazardous waste without a permit."

In the Complaint, the EPA requested that Hilo Wood Treating, Inc. perform nine compliance activities (Nos. 4 through 12). Compliance Activity No. 5 requests submittal of a "closure plan" for the closure of the drip pad unit. The "closure plan" is to include a sampling plan designed to determine the extent of chemical impact in the soil around the drip pad unit and in other areas of the facility.

On June 21, 1994, Mr. Jeffrey Morrell of Levine•Fricke visited the site and observed the location of the drip pad, the wood treatment retort, the chemical storage areas and the location where CCA reportedly was released to the soil. Mr. Morrell also identified potential locations for collection of surface soil samples.

On July 12, 1994, legal counsel for Hilo Wood Treating (Mr. David Moser of McCutchen, Doyle, Brown & Enersen in San Francisco) met with EPA counsel and staff to discuss the Complaint. One of the items discussed during this meeting, as well as during subsequent telephone calls, was the "closure plan." EPA asked that the content of the requested "closure plan" focus on the subjects specified on pages 5 and 6 of the Complaint. In later conversations, EPA also agreed to allow Hilo Wood Treating, Inc. to perform some initial surface soil sampling prior to submitting the "closure plan." This approach

1.0 Introduction

In their May 18, 1995 letter, the EPA approved the proposed additional investigative activities at the Hilo Wood Treating, Inc. facility located at 66 Kukila Street, Hilo, Hawaii (Figure 1). These activities were outlined in Levine-Fricke's April 4, 1995 report and included excavation of trenches for soil sample collection and analysis. The following report describes the results of that investigation.

Also included below is a proposed scope-of-work and cost estimate for investigative and removal activities to be implemented during the remainder of 1995 and for 1996. This information was requested by the EPA during a telephone meeting between the EPA, Hilo Wood Treating (HWT) Levine-Fricke, and counsel on August 14, 1995.

2.0 Soil Sample Collection and Analysis

On June 26, 1995, Levine-Fricke performed additional soil sample collection at the site. Soil samples were collected from trenches excavated at the eight locations shown on Figure 2. The soil sampling locations were designated HT-10 through HT-18.

2.1 Procedure

At each of the locations, a soil sample was collected at depths of about 0.5-foot, 2-feet and 4-feet below ground surface (bgs). Soil samples were collected at these depths to better evaluate the vertical extent of copper, chromium, and arsenic previously detected in these areas. Specifically, samples were collected at locations HT-11 and HT-13 immediately adjacent to the drip pad to evaluate the potential vertical extent of the metals of concern. The soil samples were collected at location HT-12 about 10 feet away from the edge of the drip pad to provide additional information as to the horizontal extent of metals in the soil. Surface soil sample HT-16 was collected adjacent to the aboveground tanks to evaluate surface metals levels in this area. The remaining three sampling locations adjacent to the treating cylinder (HT-15), pressure relief valve (HT-14A), and storage yard area (HT-10) was selected to provide information as to both the vertical and horizontal extent of metals in this area. Location HT-14 was adjusted to an area not covered by the concrete pad, therefore the new sample location was designated HT-14A. Two additional surface soil samples (HT-17 and HT-18) were collected offsite to provide information as to background levels of metals.

The surface soil samples were collected from each of the eight sampling locations by filling an 8-ounce laboratory supplied glass jar or a Mason jar with soil using a stainless steel spatula. The soil was first loosened from the ground with a pick ax. The 2- and 4-foot bgs samples were collected in the same manner as the surface soil samples following removal of the overlying soil with the backhoe. After collection, the samples were labeled, chain-of-custody documentation was prepared, and the samples were placed in an ice-cooled container for

shipment to the laboratory. American Environmental Network (AEN) in Pleasant Hill, California (a State of California certified laboratory) was selected as the laboratory.

AEN analyzed the soil samples by EPA Method 3055/6010 for total chromium, and copper; EPA Method 3050/7060 for Total arsenic; and by EPA Method 3060/7196 for hexavalent chromium. The samples with the highest levels of one or more of these constituents (HT-11 at 0.5- and 4.0-feet bgs and HT-14A at 4-feet bgs) were also selected for analysis by the toxicity characteristic leaching procedure (TCLP).EPA Method 1311 then analyzed for chromium, copper, and arsenic using the above EPA methods.

Prior to collection of each sample, the backhoe was cleaned with a solution of alconox and deionized water then pressure washed with water on a concrete pad adjacent to the drip pad. The equipment used to fill the sampling jars including the stainless steel spatula was washed with a solution of alconox and deionized water, then rinsed with deionized water.

QA/QC samples consisting of two duplicate soil samples and two equipment rinsate samples were collected during sampling. Duplicate samples were collected at HT-10 at 2-feet bgs and at HT-11 at 0.5-feet bgs and designated as HT-10-A and HT-11-B, respectively. The duplicate soil samples were collected in the same manner as site samples. The equipment rinsate samples (Rinsate 1 and 2) were collected from the pick ax and the spatula by first decontaminating the equipment as described above and then pouring deionized water over each item and into laboratory-supplied prepreserved sample bottles. QA/QC samples were analyzed by AEN for the same parameters at site samples.

2.2 Results

The results of analysis of the soil and QA/QC samples are summarized in Table 1 and Figure 2, laboratory reports are included in Appendix A. These data indicate the following:

- In surface soil samples chromium concentrations (less than 0.5-feet bgs) ranged from 43 milligrams per kilogram (mg/kg) (HT-13) to 950 mg/kg (HT-11); total copper from 71 mg/kg (HT-12) to 640 mg/kg (HT-16); total arsenic from 19 mg/kg (HT-13) to 1400 mg/kg (HT-11); and hexavalent chromium from 3 mg/kg (HT-13) to 20 mg/kg (HT-15).

- In soil samples from 4-feet bgs chromium concentrations ranged from 18 milligrams per kilogram (mg/kg) (HT-13) to 610 mg/kg (HT-11), total copper from 47 mg/kg (HT-13) to 840 mg/kg (HT-14A), total arsenic from nondetection mg/kg (HT-13) to 1900 mg/kg (HT-11), and hexavalent chromium from 3 mg/kg (HT-13) to 7 mg/kg (HT-10, HT-11, HT-14A).

- The analysis of background samples HT-17 and HT-18 indicated the presence of total chromium, copper, arsenic, and hexavalent chromium at detectable concentrations in the range of site samples as shown on Table 1 and Figure 2. Analysis of rinsate samples did not indicate parameters above the laboratory detection limit.

- Generally, total chromium, total copper and hexavalent concentrations detected in soil samples tend to decrease with depth; there does not seem to be a vertical trend in arsenic concentrations. Comparison of the results from HT-11 and HT-12 indicates that concentrations of metals seem to decrease with increasing distance from the drip pad. The levels of metals detected in surface soil samples during this investigation seem to be within the range of those from prior sampling events in the same locations.

3.0 Proposed Scope-of-Work for 1995/1996 and Associated Costs

The scope-of-work proposed for implementation during the remainder of 1995 and 1996, and associated costs is described below. This scope-of-work was developed based on the results of prior investigative activities, and on discussions with the EPA.

3.1 1995 Scope-of-Work

Based on the results of investigations to date, Levine-Fricke proposes the installation of soil borings for sample collection at five locations; at the locations of HT-10, HT-11, and HT-13; between HT-15 and HT-16 (see Figure 2); and, at an on-site upgradient location. Soil samples will be collected from each boring at 5-foot intervals to a total depth of 20-feet below ground surface. Collection of these samples will provide additional information as to the vertical extent of metals in the soil in the areas where metals were previously detected in surface soil samples.

The five soil borings will be drilled using the air rotary method and soil samples will be collected with a 5-foot core barrel sampler fitted with stainless steel liners. The lithology of each sample will be described using the Unified Soil Classification System and logs will be prepared. After sampling is complete, the borings will be grouted from the bottom on the borehole to land surface with a neat cement grout.

One sample will be selected from the core barrel at each of the 5-foot intervals for analysis for a total of 20 samples. After each sample is collected, both ends of the stainless steel liner will be covered with Teflon sheets and capped. The samples will be labeled, chain-of-custody documents will be prepared, and samples placed in an ice-cooled container for shipment via DHL to AEN for analysis. AEN will be analyze each sample by EPA Method 3055/6010 for total chromium, and copper; EPA Method 3050/7060 for Total arsenic; and, hexavalent chromium by EPA Method 3060/7196.

To reduce the potential for cross contamination between sampling locations, sampling equipment including the 5-foot core barrel sampler, and stainless steel sample liners will be cleaned with a solution of deionized water and Alconox, then rinsed with deionized water prior to sample collection. Larger equipment, including drilling rods, surge blocks for will development, and drilling equipment will be steam-cleaned prior to drilling each borehole and installing each well.

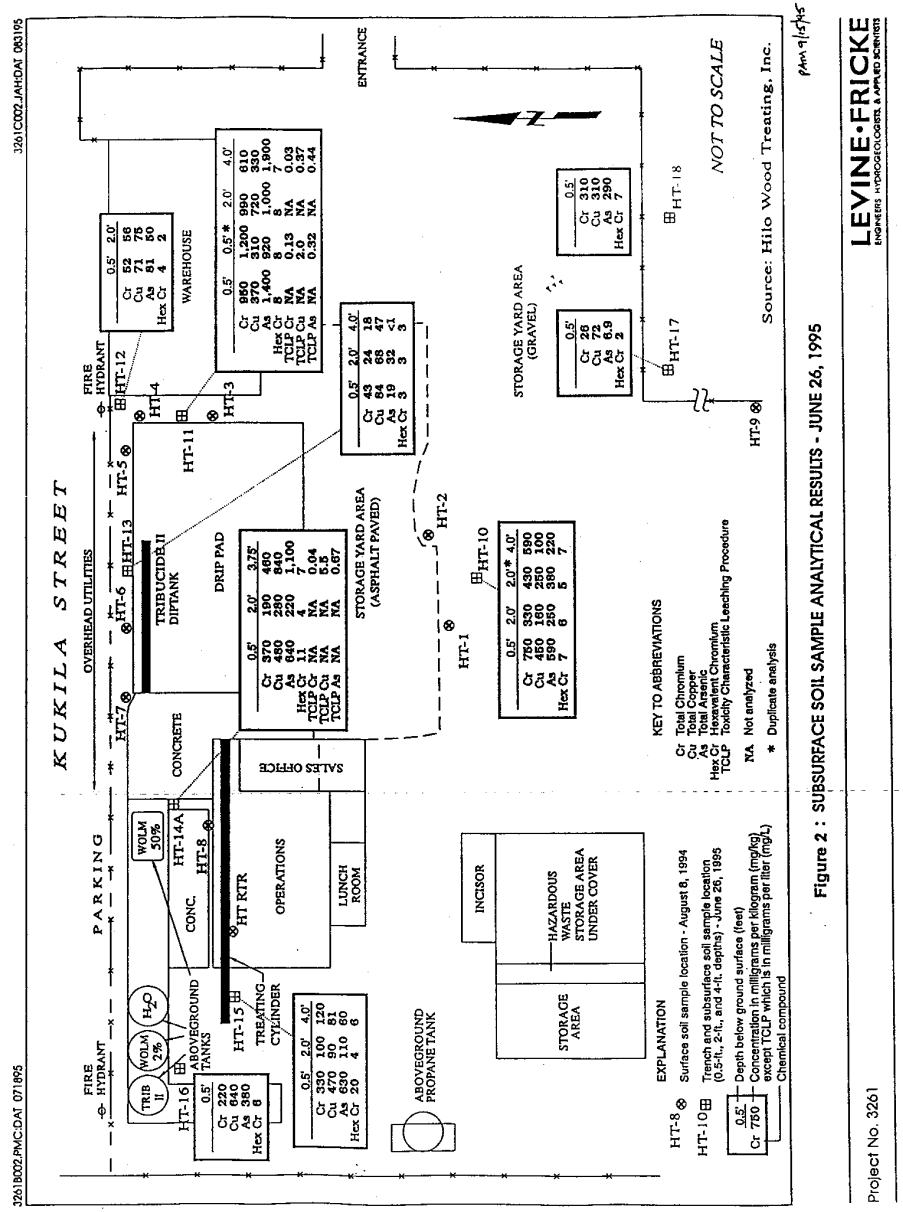

Figure 2 : SUBSURFACE SOIL SAMPLE ANALYTICAL RESULTS - JUNE 26, 1995

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ENGINEERS HYDROGEOLOGISTS & APPLIED SCIENTISTS

Project No. 3261

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

FEB 11 1997
SC

File
Hilo Wood

5 February 1997

Paul Kalaiwaa
Hawaii Department of Public Health
Solid and Hazardous Waste Branch (Rm 212)
919 Ala Moana Blvd
Honolulu, HI 96814

Dear Paul,

Attached is the field sampling report for the soil sampling we conducted at the Hilo Wood Treating site last September. As you can see from reading the report, virtually the entire Hilo Wood property is contaminated with arsenic above EPA Region IX Preliminary Remediation Goals (PRGs). The Risk Management Decision Team (RMDT) will be discussing this site on February 26, 1997, from 1 to 3 p.m. PST. Your input is always valuable, so if you are interested and available, we can tie you in by conference call.

If you need more information, please contact me at (415) 744-2028.

Sincerely,

Katherine J. Baylor, Hydrogeologist
RCRA Corrective Action Office

FEB 11 1997
SC

Field Sampling Report

Hilo Wood Treating, Inc.

Surface Soil Sampling
September 17-18, 1996

Katherine J. Baylor, Hydrogeologist
RCRA Corrective Action Office
U.S. Environmental Protection Agency, Region 9
San Francisco, California

5 February 1997

1.0 OBJECTIVE

The purpose of this one-time sampling event was to determine the surface soil concentration of arsenic, chromium, and copper at the Hilo Wood Treating site in Hilo, Hawaii. Previous investigations have shown significant concentrations of arsenic and chromium in the operating areas of the facility. However, previous results were inconclusive in determining the areal extent of contamination at the facility. Data from this sampling event will be used to determine corrective measures which may be implemented at the facility. The compounds of concern are arsenic, chromium, copper, and pentachlorophenol. Although there is not a recent (10 year) history of pentachlorophenol use at the facility, four surface soil samples were collected in the operating areas to analyze for the presence of semi-volatile organic compounds. Samples were also collected from a vacant lot directly adjacent to the Hilo Wood Treating site.

In addition, six reference soil samples were collected off-site, including four samples from Hawai'i Volcanoes National Park (Kilauea) and two from a gravel quarry near the Hilo Wood site. The reference samples were analyzed for the complete EPA Method 6010 list of metals (ICP analysis), in addition to arsenic by EPA method 7060. The reference samples, though limited in number, should help provide information on native concentrations of metals in soils.

1.1 DATA QUALITY OBJECTIVES

The purpose of this soil sampling event was to determine the areal extent of surface soil contamination at the Hilo Wood site for the following metals of concern: copper, chromium, and arsenic. The data will be evaluated against the EPA Region 9 Preliminary Remediation Goals (PRGs) for industrial sites. The relevant PRGs are:

Copper	63,000	mg/kg	
Chromium	450	mg/kg	
Arsenic	22	mg/kg	(Non-cancer endpoint)
Hexavalent Chromium (Cr^{6+})	64	mg/kg	

Previous soil sampling results at the Hilo Wood site have shown levels of arsenic and total chromium above industrial PRGs. To date, Cr^{6+} and copper have not exceeded industrial PRGs. During this sampling event (September 1996) samples were not collected or analyzed for Cr^{6+}.

Samples were not collected for Toxicity Characteristic Leaching Procedure (TCLP) metals. Previous data for the site indicates that sampling for TCLP metals would be an inappropriate use of resources, as the area to be sampled is not expected to contain leachable levels of contaminants in excess of TCLP limits. There is no historical indication of pentachlorophenol, creosote, or similar compounds at this site; however, four soil samples (3 locations plus one duplicate) were collected and analyzed for semi-volatile organics, including pentachlorophenol and related polycyclic aromatic hydrocarbons (PAHs).

1.2 PERSONNEL

The sampling was conducted from September 17-18, 1996, by the following personnel:

Katherine J. Baylor, RCRA Corrective Action Office, U.S. EPA
Paul Kalaiwaa, Solid and Hazardous Waste Branch, Hawaii Department of Health
Lois Hashimoto, Solid and Hazardous Waste Branch, Hawaii Department of Health

2.0 BACKGROUND

Background information for the Hilo Wood site was obtained from the following documents:

"Preliminary Surface Soil Investigation Report, Hilo Wood Treating, Inc., Sept. 1994, Levine-Fricke Engineers"

"Results of June 26, 1995 Sampling and 1995/1996 Scope of Work, Sept. 1995. Levine-Fricke Engineers"

2.1 SITE LOCATION

Hilo Wood Treating, Inc., is located at 66 Kukila Street in the city of Hilo on the Island of Hawaii (Figure 1). The city of Hilo receives approximately 130 inches of rain per year; the ambient wind direction is from the west, and the nearest surface water (Hilo Bay) is approximately 1.5 miles north of the site. The site is located on the edge of Hilo, in a mixed residential/industrial area. The residential population within one quarter mile of the site is estimated to be 31. There are no recognized rare or endangered species within 1 mile of the facility.

2.2 SITE HISTORY

Hilo Wood Treating, Inc., began operations in 1967, and in November 1980 received approval as a hazardous waste generator. The facility has used chromated copper arsenate (CCA) in the past, but is currently using less toxic compounds. Previous analytical data (Figure 2) indicates the presence of copper, chromium, and arsenic, primarily in locations near the retort cylinder and drip pad.

Information on the use of organic compounds (pentachlorophenol, creosote) is sketchy, but the current site owner, Sam Kamelamela, has stated that he has not used organic wood-treating products since 1983. No information is available on the use of organic compounds at the Hilo Wood Treating site prior to 1983.

2.3 GEOLOGY AND HYDROGEOLOGY

The site is located on the Island of Hawaii, the youngest of a northwest-trending string of islands which make up the Hawaiian Island chain. Basalt is the predominant rock type. Groundwater beneath the site is used for industrial purposes only; depth to groundwater is approximately 50 feet.

65515
telecon

415-744-3750

Wells which provide the drinking water to the city of Hilo are located approximately two miles upgradient of the facility. Previous sampling at the site indicates that copper, chromium, and arsenic contamination extends to a depth of several feet subsurface in contaminated areas of the facility (retort and drip pad); however, specialized drilling equipment is needed to sample at deeper intervals, so the vertical extent of contamination is unknown at this time.

2.4 BACKGROUND METALS CONCENTRATIONS

One goal of this sampling event was to establish the local background concentration of arsenic. The most common naturally-occurring source of arsenic in the environment is volcanic activity. A literature search was conducted to determine native concentrations of arsenic, copper, and chromium in Hawaiian volcanic soils. In addition, six reference soil samples were collected off-site, including four samples from Hawai'i Volcanoes National Park (Kilauea) and two from a gravel quarry near the Hilo Wood site. The reference samples were analyzed for the complete EPA Method 6010 list of metals (ICP analysis), in addition to arsenic by EPA method 7060. The reference samples, though limited in number, should help provide information on native concentrations of metals in soils. Although the US Geological Survey (USGS) has done extensive testing of surface soils in the continental U.S., data for Hawaii, Alaska, and the Pacific Trust Territories is extremely limited.

An extensive literature search revealed relatively little information on naturally-occurring concentrations of metals in Hawaii soils. The following documents provided useful information:

"Distribution of Arsenic in the Sediments and Biota of Hilo Bay, Hawaii" Leon Hallacher, et al Pacific Science, vol. 39, no. 3, 1985

"The Copper Content of Typical Soils and Plants of the Hawaiian Islands" Giichi Fujimoto and G. Donald Sherman, Hawaii Agricultural Experiment Station, Technical Progress Report 121, 1959

"Chromium Distribution in the latosols of the Hawaiian Islands" Martha Nakamura and G. Donald Sherman, Hawaii Agricultural Experiment Station, Technical Bulletin 37, 1958

"A Baseline Study of Soil Geochemistry in Selected Areas on the Island of Hawaii" State of Hawaii Department of Planning and Economic Development

The U.S. Department of Agriculture Natural Resources Conservation Service provided considerable assistance in the literature search undertaken as part of this investigation. In general, metals concentrations in volcanic soils show considerable variability, based on several factors, including, but not limited to: original rock type, amount of weathering, soil development type, and organic content. Not only do andesites vary from basalts, but nearly identical rocks from the same island can show significant variability based on their origin within the magma chamber. Weathering and soil type also have a significant impact on residual metal concentrations. For this event, four background samples (three samples and a duplicate) were collected from pristine areas within Volcanoes National Park (Figure 4) and two from a gravel quarry near the Hilo Wood site (Figure 1). The owner of Hilo Wood, Sam Kamelamela, indicated that the surficial material at Hilo Wood was obtained from

the quarry (personal communication). Additionally, Kamelamela indicated that surface soils are routinely moved around the site to fill in small erosional channels formed during heavy rains.

3.0 MAPS AND FIGURES

Figure 1: Site Location map
Figure 2: Locations of previous soil samples
Figure 3: Soil Sampling Locations and Analytical Results
Figure 4: Off-site (Kilauea) sampling locations
Figure 5: Graph of analytical results: Arsenic, Chromium, Copper
Table 1. Soil sampling results

4.0 SAMPLE LOCATIONS AND NUMBER OF SAMPLES

Twenty-five soil locations were sampled on-site for metals (Cu, Cr, As), and three locations were sampled for semi-volatile organics to check for the presence of pentachlorophenol. Four locations were sampled in the Hawaii Homes vacant lot adjacent to the facility (figure 3). Six additional soil samples were collected off-site at reference locations (four at Hawai'i Volcanoes National Park, two at gravel quarry). Reference concentrations have not been determined; previous reference sampling was inadequate to determine background concentrations.

The soil sampling strategy consisted of a combination of grid and judgmental (biased) samples. The grid samples were collected on approximately 50-foot centers (Figure 3); measured sampling locations, referenced to the southwest corner of the site, are listed in Table 1. The choice of the southwest corner as an origin of measurement is arbitrary, but is convenient because it allows all the locations (north and east measurements) to be expressed as positive numbers. The judgmental samples were collected in areas suspected of contamination, based on surface water drainage patterns and/or evidence of soil staining. Sample numbers and locations are listed below, and shown graphically in Figures 1, 3, and 4. Sampling locations and analytical results are included in Table 1.

Sample Number	Location
HWT 1 - 4	Hawaiian Homes vacant lot
HWT 5 - 32	Hilo Wood Treating on-site
HWT 33-36	Hawai'i Volcanoes (Kilauea) reference locations
HWT 37-38	Gravel Quarry reference location

5.0 ANALYTICAL RESULTS

5.1 METALS

Samples were analyzed at EPA's Region 9 Laboratory in Richmond, California. Within the Hilo Wood Treating site, the following statistical information was determined from the 28 samples (25 locations plus three duplicate samples) collected on-site (Figures 3 and 5). The large standard deviations are indicative of the wide range in values reported. However, 26 of 28 samples exceeded EPA Region 9's arsenic Preliminary Remediation Goal of 22 mg/kg (non-cancer endpoint).

Arsenic:	Average:	341.468 mg/kg
	Std. Deviation:	385.283 mg/kg
	Range:	18.1 to 1640 mg/kg
Chromium:	Average	360.296 mg/kg
	Std. Deviation:	401.977 mg/kg
	Range:	27 to 1640 mg/kg
Copper:	Average	400.672 mg/kg
	Std. Deviation:	426.06 mg/kg
	Range:	52.3 to 1780 mg/kg

Four samples collected on the adjacent Hawaiian Homes vacant lot (HWT1 through HWT4) showed significantly lower concentrations of arsenic, chromium, and copper, and none exceeded the PRGs for arsenic (Figure 5):

Arsenic:	Average:	2.55 mg/kg
	Std. Deviation:	0.896 mg/kg
	Range:	1.6 to 3.9 mg/kg
Chromium:	Average	16 mg/kg
	Std. Deviation:	4.118 mg/kg
	Range:	11.5 to 21 mg/kg
Copper:	Average	60.75 mg/kg
	Std. Deviation:	12.62 mg/kg
	Range:	42.3 to 74.3 mg/kg

Reference Metal Concentrations

Six reference samples were collected to determine native concentrations of target elements. Of the six samples, four were collected at Volcanoes National Park (Figure 4), and two at a gravel quarry located approximately 2000 feet northeast of the Hilo Wood Treating site (Figure 1). None of the reference samples exceeded Region 9 PRGs. The highest reference sample arsenic concentrations

were found in well-developed organic-rich soil collected near the Puhimau Crater overlook in Volcanoes National Park.

5.2 SEMI-VOLATILE ORGANIC COMPOUNDS

Four soil samples (three samples and one duplicate) were collected in the facility operating area and analyzed for semi-volatile organics, due to concerns that pentachlorophenol may have been used at the facility. One sample (HWT53) contained 1300 ug/kg (ppb) of pentachlorophenol. This sample was located in the northeast corner of the site, located between a storage shed and an above-ground storage tank/retort cylinder (Figure 6). Pentachlorophenol was also detected in samples HWT 51/52, a sample and duplicate located near the east edge of the drip pad, at a concentration of 480 ug/kg. However, the finding of 480 ug/kg was "J" qualified by the laboratory, which indicates that the compound was positively identified, but the value is estimated, because it falls below the Contract Required Quantitation Limit (CRQL). Although the concentrations of pentachlorophenol found on-site were below both the industrial (7900 ug/kg) and residential PRGs (2500 ug/kg), they exceeded the Soil Screening Level for migration to groundwater (30 ug/kg).

Two phthalate compounds which were also detected, bis(2-ethylhexyl)phthalate and di-n-butylphthalate, are considered insignificant, because they are common laboratory contaminants and were found in the laboratory blank.

5.3 QA/QC ANALYTICAL RESULTS

Blank Samples

No blank samples were collected. "Blank" soils are not readily available, as it is unlikely that any blank soil sample would match the texture, color, and moisture content of the samples submitted for analysis. No re-usable equipment was used, so no equipment blank was collected. The laboratory blank was contaminated with two phthalate compounds, bis(2-ethylhexyl)phthalate and di-n-butylphthalate. These are common laboratory contaminants, and are not considered significant.

Duplicate Samples

Three duplicate metals samples were collected. The duplicate pairs (HWT 25/26, HWT29/30 and HWT 31/32) were sent blind to the lab, meaning that the duplicate sample was not identified to laboratory personnel as a duplicate of the original sample. The duplicate samples were evaluated by calculating the Relative Percent Difference (RPD) for the paired samples. The RPD is calculated by dividing the difference between the samples by the mean of the samples, and multiplying by 100 to obtain percent. For example, the RPD for arsenic in the duplicate pair HWT 25/26 would be calculated as shown below:

$$\text{RPD} = \frac{\text{difference between samples}}{\text{mean of samples}} \times 100 = \frac{420-397}{408.5} \times 100 = 5.6\ \%$$

The RPDs for metals were nearly all within 30%, which is generally considered acceptable. Most RPDs were within 10%, as shown below. These duplicate sample results are an indication both that the soil samples were relatively homogeneous, and that the laboratory had good precision in the analyses.

HWT 25/25 As = 5.6 %
Cr = 14.2 %
Cu = 4.2 %

HWT 29/30 As = 4.2 %
Cr = 5.6 %
Cu = 8.9 %

HWT 31/32 As = 7.8 %
Cr = 31 %
Cu = 14.4 %

There was insufficient data available to calculate RPDs for the semi-volatile compounds.

Matrix Spike / Matrix Spike Duplicate

The matrix spike and matrix spike duplicate (MS/MSD) analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate poor laboratory technique, sample heterogeneity, or matrix effects which may interfere with analysis.

For this sampling event, the matrix spike recovery exceeded allowable QC limits for some of the arsenic samples analyzed by Graphite Furnace Atomic Absorption (GFAA). The affected samples included only those analyzed by GFAA, which includes the lower-concentration samples. Samples which were high in arsenic (above 100 mg/kg) were analyzed by Inductively Coupled Argon Plasma (ICP); the MS/MSD analyses for the ICP analyses were acceptable.

From a practical perspective, this means that the high arsenic values (above 100 mg/kg) are qualitatively and quantitatively acceptable, and may be used for making remediation decisions at the site. The low arsenic values are potentially biased high, which means that the low arsenic values reported for the vacant lot are potentially higher than what is actually there. More significantly, the arsenic values on the vacant lot are well below PRGs, so, even if biased high, the actual concentration of arsenic would still be below PRGs. Therefore, even with the matrix spike QC problem, this data can be used to support a "no further action" determination for the soils on the Hawaiian Homes vacant lot adjacent to (southeast of) the facility, where samples HWT 1- 4 were collected.

Surrogate Recoveries

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to analysis. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results. For this sampling event, no surrogate recoveries exceeded the method QC limits. The surrogate compounds and respective QC limits are included in the attached laboratory data report (Appendix 1).

6.0 DISCUSSION OF RESULTS

The analytical results indicate that the Hilo Wood Treating site is contaminated with arsenic, chromium, and copper in the surface soils. Of these compounds, arsenic exceeded EPA Region 9's Preliminary Remediation Goals (PRGs) in all but two of the on-site samples. None of the samples collected on the adjacent Hawaiian Homes property (HWT1 through HWT4) or the six reference samples (HWT33 through HWT 38) exceeded PRGs for any of the three compounds.

The finding of 1300 ug/kg pentachlorophenol may be significant. Although this result is below Region 9 PRGs, it is above EPA's Soil Screening Guidance (EPA/540/R-96/018 and EPA/540/R-95/128) for migration to groundwater. Subsurface sampling would be needed to determine the vertical extent of pentachlorophenol at the site.

7.0 CONCLUSIONS

The purpose of this soil sampling event was to follow up on the Risk Management Decision Team (RMDT) recommendation that additional soil samples be collected to adequately characterize the extent of surface soil contamination. The RMDT's goal in requesting the additional site characterization was to determine the areal extent of paving necessary to protect worker health at the site, based on the PRGs. The 28 on-site samples (HWT5 through HWT32) indicate that the Preliminary Remediation Goal for arsenic (22 mg/kg, non-cancer endpoint) is greatly exceeded in virtually every sample.

The four samples collected on the adjacent Hawaiian Homes property (HWT1 through HWT4) indicate that this parcel is not contaminated with arsenic, chromium, or copper.

The reference soil samples (gravel quarry and Volcanoes National Park) indicate the range of background concentrations which may be expected to occur in native soil. All six reference samples were significantly below on-site concentrations of arsenic, chromium, and copper. ?

The four samples collected for semi-volatile organics (HWT 51 through HWT 54) indicate that pentachlorophenol has been used at the facility. However, the lateral and vertical extent of pentachlorophenol contamination is unknown at this time.

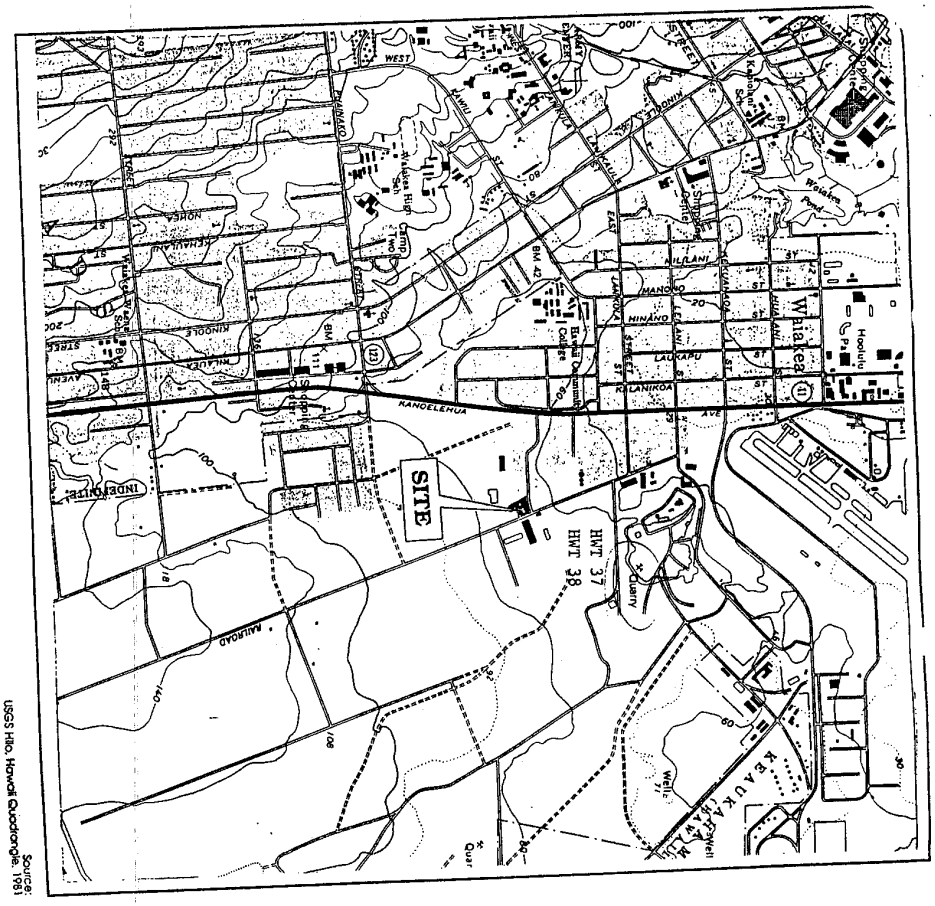


Figure 1 : SITE LOCATION MAP

Project No. 3261

LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS, & APPLIED SCIENTISTS

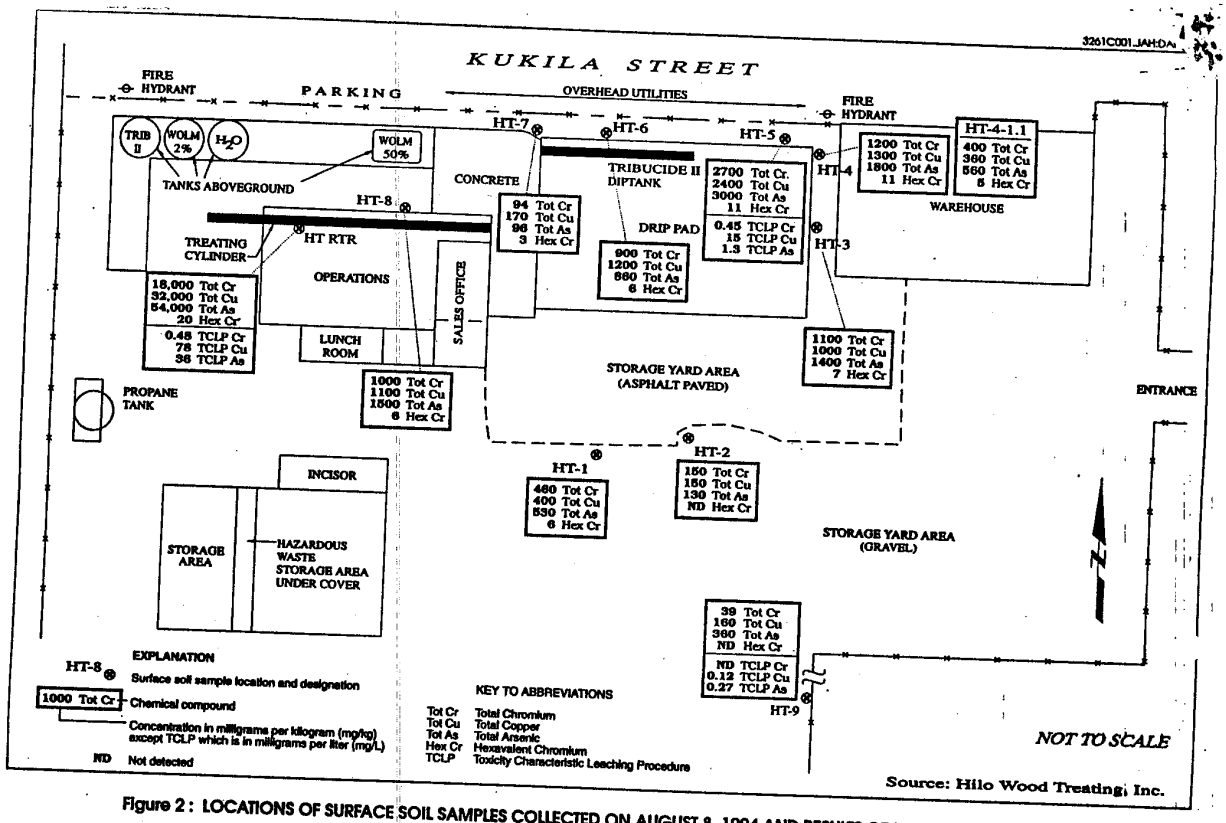


Figure 2 : LOCATIONS OF SURFACE SOIL SAMPLES COLLECTED ON AUGUST 8, 1994 AND RESULTS OF LABORATORY ANALYSIS

Project No. 3261

LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS, & APPLIED SCIENTISTS

Hilo Wood Treating, Inc.

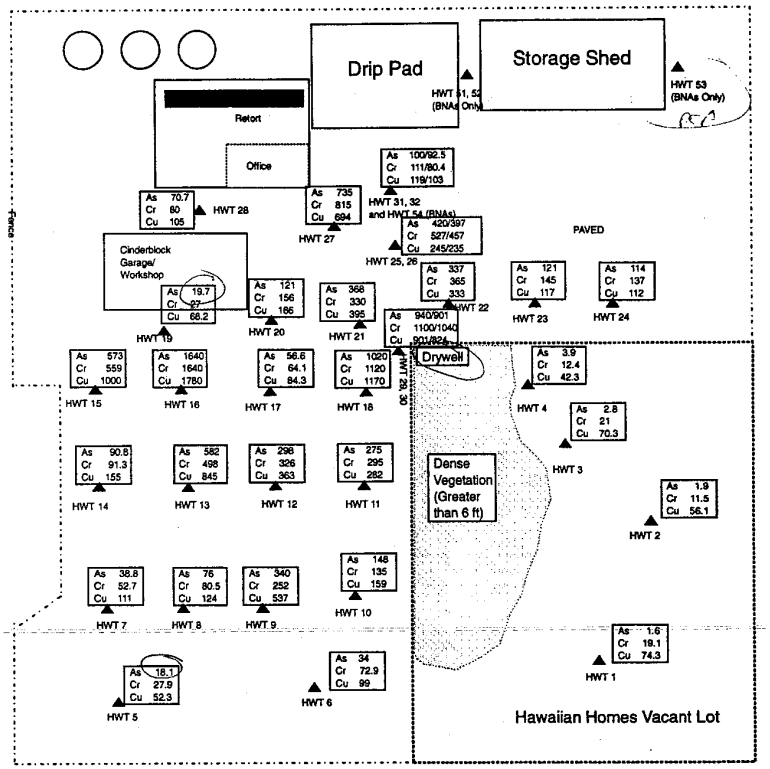
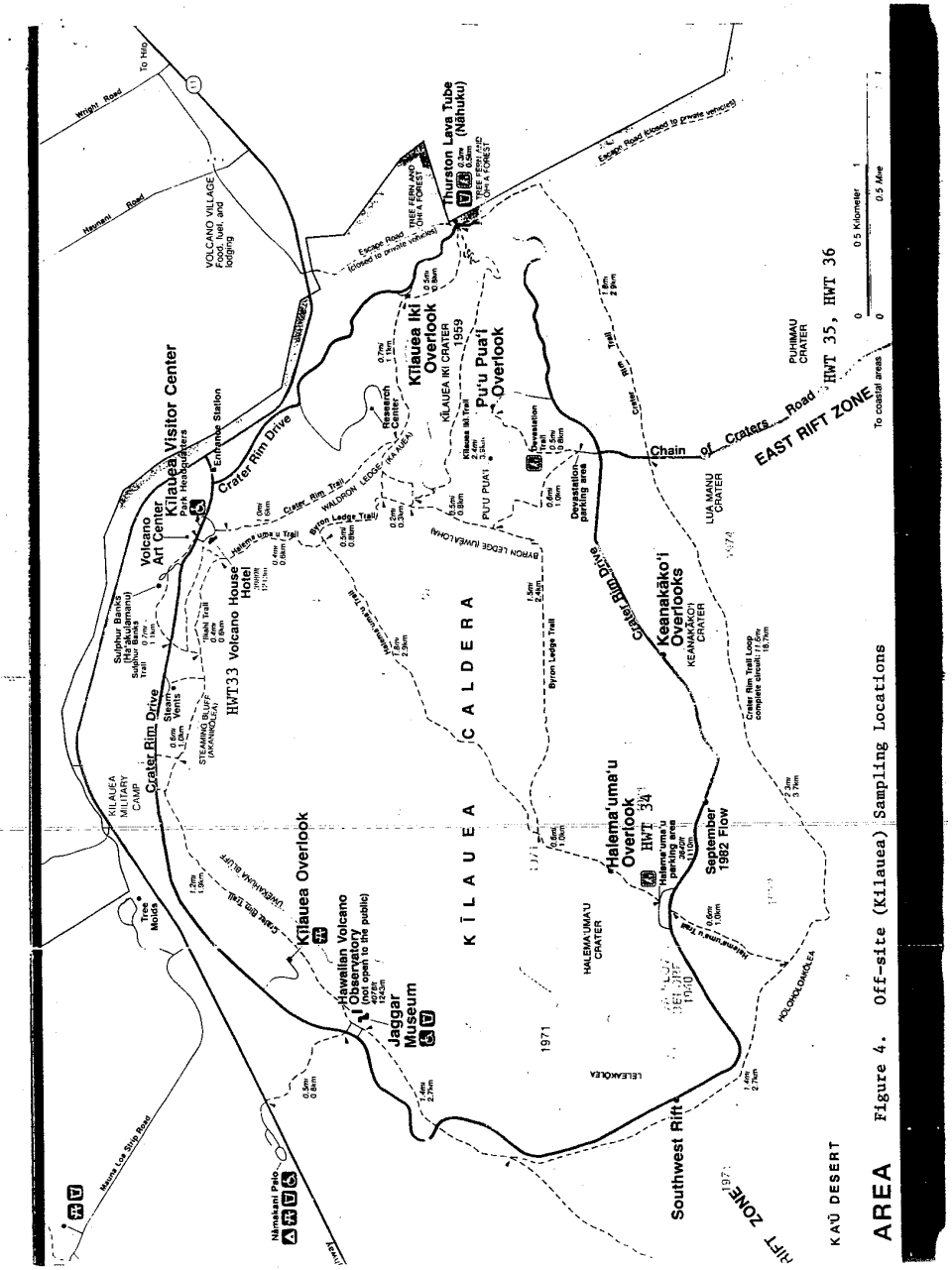


Figure 3. Soil Sampling Locations and analytical results

KEY

As = Arsenic (mg/kg)
Cr = Chromium (mg/kg)
Cu = Copper (mg/kg)
mg/kg = part per million (ppm)

PRG Reference:
As 22 mg/kg (non-cancer endpoint)
Cr 450 mg/kg (industrial soil)
Cu 63,000 mg/kg (industrial soil)



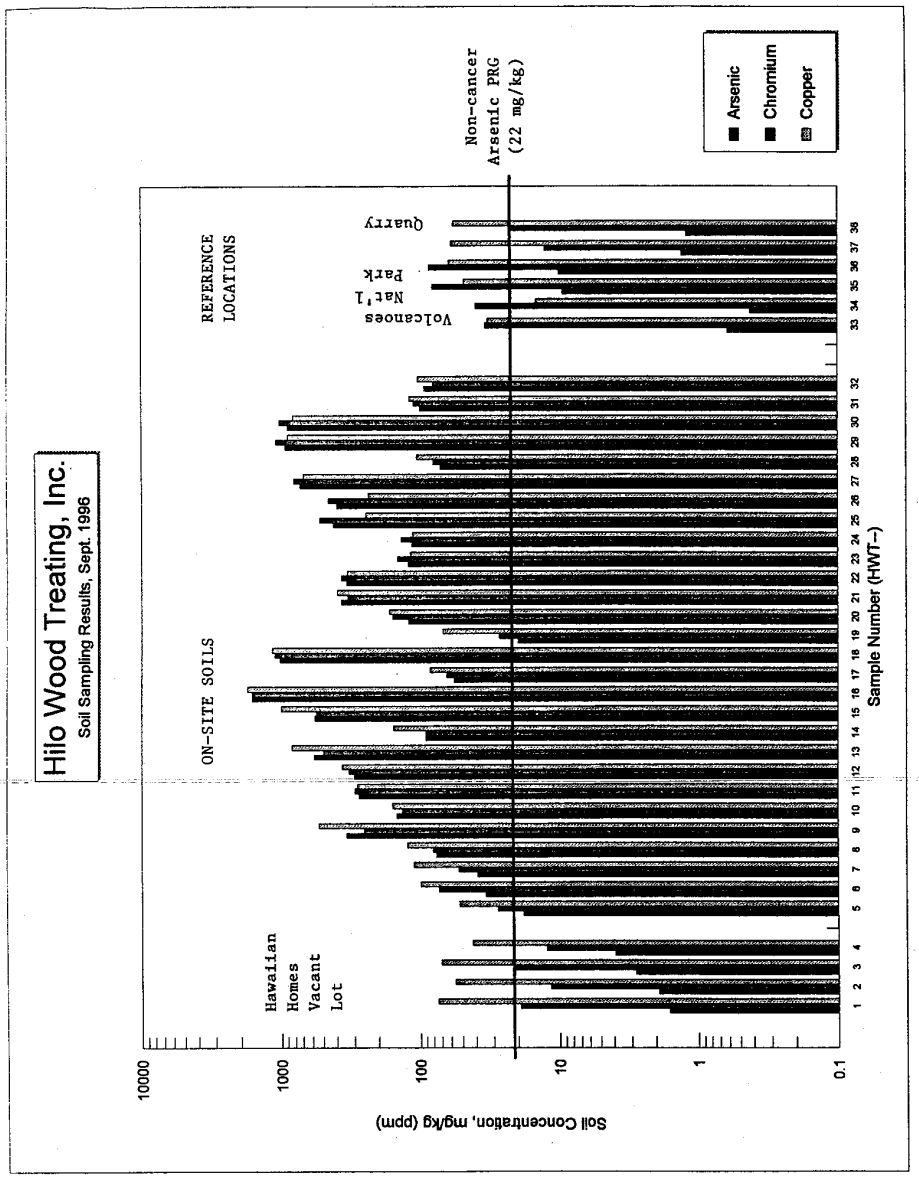


Figure 5. Graph of Analytical Results: Arsenic, Chromium, Copper

Hilo Wood Treating Soil Sampling Locations
Reference is southwest corner of site

Location	North	East	Copper	Chromium	Arsenic
Sample ID	feet	feet	mg/kg	mg/kg	mg/kg
HWT1	60	330	74.3	19.1	1.6
HWT2	135	365	56.1	11.5	1.9
HWT3	180	315	70.3	21	2.8
HWT4	215	295	42.3	12.4	3.9
HWT5	35	60	52.3	27.9	18.1
HWT6	40	170	99	72.9	34
HWT7	90	50	111	52.7	38.8
HWT8	90	95	124	80.5	76
HWT9	90	145	537	252	340
HWT10	95	195	159	135	148
HWT11	160	200	282	295	275
HWT12	155	150	363	326	298
HWT13	155	100	845	498	582
HWT14	155	50	155	91.3	90.8
HWT15	210	55	1000	559	573
HWT16	210	95	1780	1640	1640
HWT17	210	145	84.3	64.1	56.6
HWT18	210	200	1170	1120	1020
HWT19	245	85	68.2	27	19.7
HWT20	250	150	166	156	121
HWT21	250	200	395	330	368
HWT22	260	250	333	365	337
HWT23	260	300	117	145	121
HWT24	260	340	112	137	114
HWT25	290	220	245	527	420
HWT26 (D)	290	220	235	457	397
HWT27	305	180	694	815	735
HWT28	310	110	105	80	70.7
HWT29	235	220	901	1100	940
HWT30 (D)	235	220	824	1040	901
HWT31	325	215	119	111	100
HWT32 (D)	325	215	103	80.4	92.5
HWT33	Kil. Steam Vents (North Rim)		32.4	33.9	0.61
HWT34	Kil. Halema'uma'u Overlook		14.5	39.6	0.42
HWT35	Kil. Puhimau Crater		47.9	80.9	9.3
HWT36 (D)	Kil. Puhimau Crater		61	85.5	9.9
HWT37	Gravel Quarry		59	12.5	1.3
HWT38	Gravel Quarry		57.1	22.8	1.2

(D)=DUPLICATE OF PRECEEDING SAMPLE

Table 1. Analytical Results

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801-3378

FEB 2 3 2006

In reply, please refer to:
EMD/SHWB

February 22, 2006 U02025RT

Mr. Manuel Soares
MS Auto, Inc.
30 Kukila Street
Hilo, Hawaii 96720

Dear Mr. Soares:

SUBJECT: Former Divaco Cooperative
Facility ID 9-601140

The Department of Health (DOH) has reviewed the "Underground Storage Tank Closure Report," dated August 26, 2005, and prepared by Walker Consultants regarding the removal of a 4,000-gallon and a 6,000-gallon underground storage tanks (USTs) at the subject site. Please note the report has been placed with the public record.

DOH notes that soil samples obtained from beneath the USTs following removal were analyzed and found to be "non-detectable" for petroleum contaminants. Based on the documentation submitted, DOH concludes that *no further work* is necessary regarding the UST system removed from the site. However, please be aware that if any evidence of petroleum contamination is discovered in the future at your facility, then state law requires notification to DOH within 24 hours. This includes evidence of *de minimis* contamination, contamination found at concentrations lower than DOH Tier 1 action levels, and contamination found after receiving a status of *no further work* from DOH.

If you have any questions regarding this letter, please contact Mr. Richard Takaba of our Underground Storage Tank Section at (808) 586-4226.

Sincerely,

STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

LINDA LINGLE
GOVERNOR OF HAWAII

CHIYOME L. FUKINO, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
EMD/SHWB

November 16, 2007

ENFORCEMENT CONFIDENTIAL
PREDECISIONAL AND DELIBERATIVE
DO NOT RELEASE

TO: Thomas E. Arizumi, P.E., Chief
Environmental Management Division

FROM: Steven Y.K. Chang, P.E., Chief
Solid and Hazardous Waste Branch

SUBJECT: Brief Summary of Field Citation No. 2583
Akana Petroleum Inc.
50 Kukila Street, Hilo, Hawaii
Facility ID No. 9-601743

On February 11, 2005, Mr. Anthony John conducted an inspection at the subject facility. The following USTs were inspected:

UST 92	10,000 gallon gasoline
UST 87	10,000 gallon gasoline
UST 98358	10,000 gallon diesel

During the inspection, violations of the Hawaii Administrative Rules 11-281 UST regulations (HAR 11-281) were noted and Field Citation No. 2583 was issued.

The field citation issued on February 11, 2005, was automatically withdrawn, pursuant to HAR Section 11-281-126(d). In a recent review, DOH determined that it will not pursue formal enforcement against Akana Petroleum Inc. regarding the violations cited in Field Citation No. 2583.

Recommendation: No further action.

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

JUN - 9 1997

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

Hilo Wood
file

June 4, 1997

Mr. Paul K. Kalaiwaa
Environmental Health Specialist
Hazardous Waste Management Section
Solid & Hazardous Waste Branch
Environmental Management Division
Department of Health
919 Ala Moana Blvd., Suite 212
Honolulu, Hawaii 96814

Dear Mr. Kalaiwaa:

The staff of Land Management Division wishes to thank you for taking time out from your busy schedule to come to our office on May 30, 1997 and participate in the discussion on how DHHL should handle Hilo Wood Treating's situation.

Your input and advice was most helpful. The environmental issues are so complex and complicated that without your expertise, the department would not be able to address the situation in a manner that protects the department and is fair to the lessee as well.

Sincerely,

RAY SOON, Administrator
Land Management Division

c: Kumu Vasconcellos
Deputy Attorney General

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

MEMORANDUM

DATE: May 30, 1996

SUBJECT: Risk Management Decision Team (RMDT) Followup Recommendation for the Hilo Wood Treating, Inc. Facility

FROM: Ron Leach Ron Leach
Risk Management Decision Team Leader

TO: Clint Seiter
Project Manager

The RMDT has completed its followup evaluation of the Hilo Wood Treating, Inc. (HWTI) facility. The evaluation included review of your updated site background summary and a peer review meeting on April 30, 1996. The initial RMDT memorandum is dated January 18, 1996 and contains the recommendations from the first peer review meeting held on January 10, 1996.

The following people attended the followup peer review meeting held on April 30, 1996: Kathy Baylor, Mary Blevins, Larry Bowerman, Barry Cofer (enforcement), Arlene Kabei (enforcement), Tom Kelly, Ron Leach, Kaoru Morimoto (enforcement), Clint Seiter (enforcement), Patrick Wilson, and Lily Wong (enforcement). Ron Leach facilitated the meeting.

You requested RMDT assistance in addressing the following questions: Given the new information collected since the first RMDT meeting, (1) what is the optimum strategy for covering the facility and (2) what, if any, are the next steps for dealing with the potential groundwater impacts.

RMDT Recommendation: The RMDT recommends that the following actions be taken:

(1) Request that the president of HWTI inform adjacent property owners that past releases from the facility have contaminated their property. The Department of Hawaii Homes owns the adjacent empty property to the south of the facility. The lower lot of the facility is owned by Akana Petroleum and is leased to HWTI. Considering the likely concerns of the Department of Hawaii Homes, a native peoples organization, the RMDT suggests that there be some written

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record in EPA files documenting that the neighboring property owners have been informed about the soil contamination. This could take the form of a Record of Communication that describes a telephone conversation between EPA and the president of HWTI.

(2) Require that HWTI develop and submit a plan to EPA for paving all exposed soils in the main facility area, the leased lower lot, and the adjacent empty property located to the south of the facility. The plan must address both the cover construction and long-term maintenance of the paving. All unpaved areas, as well as locations where the existing cover is damaged, must be paved with road grade asphalt unless HWTI can successfully demonstrate to EPA why the paving is not needed or cannot be constructed.

One way to demonstrate that the paving is not needed is to sample the surface soil and determine areas where concentrations of arsenic, chromium, and copper are below EPA's industrial health-based Preliminary Remediation Goals (PRG's). The RMDT believes that surface soil sampling is an effective way to minimize the area to be paved. If surface soil sampling is conducted, the RMDT also suggests, if feasible, that samples at the bottom of the dry wells be collected and analyzed to determine if site-related contaminants have reached the subsurface via a dry well conduit.

It may be possible for RCRA program staff to conduct the soil sampling and have the samples analyzed at the EPA Region 9 laboratory in Richmond, California. The RMDT suggests that you explore this option as one way to obtain the additional soil sampling data.

In the January 18, 1996 recommendation memorandum, the RMDT expressed concern that facility workers could be exposed to unacceptable risks from coming into contact with contaminated surface soils. Paving exposed soils that are contaminated with arsenic, chromium and copper will greatly reduce the health risks to on-site workers at the facility and to anyone wandering onto the adjacent unfenced property;

(3) Require or strongly encourage the facility owner to put a deed notice on the property. The deed notice will provide recommended conditions on the use of the property regardless of any future ownership changes. Specific conditions are recommended in the January 18, 1996 RMDT recommendation memorandum.

(4) Strongly encourage the facility owner to institute adequate health and safety procedures for those workers who handle the sodium borate wood preservative. These safety procedures would include, but not be limited to, splash-proof or dust resistant safety goggles, appropriate clothing and gloves to prevent repeated or prolonged skin contact with the sodium borate, and use of appropriate respirators. These procedures are taken from the Material Safety Data Sheet for sodium borate.

(5) No immediate action is recommended for investigation of potential groundwater contamination at this time for the following reasons: (1) the nearest drinking water supply well is currently located approximately 2 miles upgradient of the HWTI facility, (2) Toxic Characteristic Leaching Procedure (TCLP) tests suggest that arsenic, chromium and copper may not be easily leached from soil at the facility and thus would have a smaller chance of migrating downward toward the groundwater, (3) the drip pad of the facility is currently paved, bermed and covered by a roof, (4) HWTI stopped using chromated copper arsenate (CCA) in June 1994 and now uses sodium borate for wood treating, and (5) there is currently no funding available from the facility nor the regulatory agencies to pay the high cost of bringing drilling equipment from off-island to install monitoring wells.

In addition, the RMDT suggests that any EPA letters to the facility indicate that the site cover is an interim solution to address the most immediate risks to human health, that HWTI is responsible for the contamination, and that EPA may require additional work in the future.

The recommendations are based on the following rationale:

The RMDT obtained additional information about the HWTI facility from a site visit by EPA inspectors and through researching groundwater use in the area. This information is detailed in the updated background summary.

On February 13, 1996, EPA inspectors Barry Cofer and Kaoru Morimoto visited the facility and subsequently prepared a report summarizing the inspection. The report provides valuable information about the facility, including processes, health and safety procedures, identification of paved and unpaved areas, drainage patterns, surrounding property use, and a rough chronology of events. The chronology indicates that pentachlorophenol was used at the facility from approximately 1969 to 1973. In addition, it was discovered that there are dry wells reported to be 30 feet deep located on the adjacent property to the south of HWTI that are used to collect and discharge rainwater runoff to the subsurface.

Tom Kelly of the RMDT researched groundwater use in the area and determined that the nearest drinking water supply wells are located approximately 2 miles upgradient of the HWTI facility and that there are a cluster of 12 wells in the immediate vicinity of the facility that are owned by Hawaii Electric Light Company, Inc. According to the Hawaii Department of Health, these 12 wells are not used as a source of drinking water. The wells are used as a source of cooling water for the power plant.

The RMDT is recommending that HWTI develop a paving plan so that EPA will know what areas are to be paved (maps), the type of paving, when the pavement will be installed, and long term maintenance procedures. Maintenance of the asphalt cover is particularly important since the owner of HWTI has indicated that gaps and holes in the underlying basalt lava make it difficult to maintain the pavement.

The RMDT is recommending the most conservative approach of paving all areas of the facility and adjacent property because the full extent of surface soil contamination is not known. For example, although there is some indication that the adjacent lot to the south has been impacted from operations at HWTI, the full extent is uncertain. EPA's industrial PRG for arsenic was exceeded in two surface soil samples taken on the adjacent property by HWTI's consultant Levine-Fricke in June 1995. The samples, with arsenic concentrations of 6.9 mg/kg and 290 mg/kg, both exceeded the industrial PRG (cancer endpoint) concentration of 2.4 mg/kg. Locations at the facility where surface soil sampling was done, show concentrations of arsenic and chromium at levels that represent an acute health risk to on-site workers. Since HWTI has limited financial resources and may not be able to both pave and undertake additional soil sampling, the RMDT recommendation to pave focuses on the most immediate health risks while allowing HWTI the option of conducting additional sampling.

The RMDT is suggesting that a deed notice be put on the property so that future owners will be made aware of the existing soil contamination. The deed notice will also limit property use and ensure that the property remain paved for all commercial or industrial uses.

The RMDT is recommending some health and safety procedures as a precaution to limit potential risks to facility workers. It is not clear from the EPA site visit if workers who handle the sodium borate (wood preservative) are taking adequate health and safety precautions. The EPA site visit indicated that workers may be using respirators when handling the sodium borate but that it was not clear if other important safety precautions were being taken.

We hope that the RMDT has been useful in helping you resolve the issues related to your facility. If you have any questions on the RMDT recommendations or require further support, please stop by or call me at 4-2031. Thanks.

To: Ronald Leach
cc:
From: Clint Seiter
Date: 04/05/96 11:42:51 AM
Subject: Draft #2 of RMDT Hilo Memo

Followup Risk Management Decision Team (RMDT) Meeting for Hilo Wood Treating, Inc.

On January 10, 1996, a meeting was held with the Risk Management Decision Team (RMDT) to discuss possible remediation options for Hilo Wood Treating, Inc. This wood treating facility, located in Hilo, Hawaii, is the object of an EPA enforcement action due to the heavy amounts of surface soil arsenic contamination detected by inspectors on the premises around the drip pad. Based upon information provided during this meeting, the RMDT recommended that the first remediation priority should be the capping of the contaminated area. I have since received additional information concerning the site and have requested a followup meeting with RMDT. The meeting has been scheduled for April 30 from 1:00 to 3:00 in Room 1002 to discuss with the RMDT the best strategy for capping the facility's hotspots and determining further action for the groundwater.

On February 13, 1996, EPA inspectors Barry Cofer and Karou Morimoto visited the facility. Specifically, they were requested to determine (1) where rain water would have most likely run off a bermless drip pad, (2) the location of other facility drainage points, (3) health and safety procedures that workers take to minimize exposure to surface soil contamination, (4) what the properties adjacent to the facility are used for, (5) the approximate dimensions of the unpaved area south of the drip pad, and (6) whether there were any unusual signs of discoloration in the ground surrounding the drip pad. A major part of the upcoming RMDT meeting will be devoted to a review of the data that Barry and Karou collected, including numerous photographs taken of the site. Barry's report on his findings is included in Attachment 1 of this memo.

Tom Kelly has also gathered data concerning the wells in the vicinity of the facility, and the drinking water situation in the city of Hilo and its environs. Part of the RMDT meeting will also be devoted to Tom's findings, which are summarized in Attachment 2.

GOAL: Upon review of the data, it is my hope that attendees of the meeting will be able to develop an optimum strategy for the capping of the facility. "Optimum" is defined as offering the best protection for on-site workers and visitors against exposure to surface contamination at the least cost possible. In addition, I hope to determine the next steps, if any, for dealing

with potential groundwater impacts.

ATTACHMENT 1

INSPECTION REPORT
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IX
WASTE COMPLIANCE BRANCH

Purpose:	RCRA Trip Report
Facility:	Hilo Wood Treating Company 66 Kukila Street Hilo, HI 96720
U.S. EPA ID Number:	HID044044178
Date of Investigation:	February 13, 1996
U. S. EPA Investigators:	Barry Cofer Field Investigator/Compliance Officer (415) 744-2121 Kaoru Morimoto Environmental Engineer
State Investigator:	Lois Hashimoto Environmental Health Specialist (808) 586-4238
Facility Representative:	Sam Kamelamela President

BACKGROUND

Hilo Wood Treating Co. Inc. submitted a Notification of Hazardous Waste Activity in August of 1980, and submitted Part A of the Permit Application in September of 1980. EPA issued 3008(a) compliance orders to Hilo Wood in April of 1987 and May of 1994. This site visit was conducted to partially address the following questions and issues raised during recent enforcement activities and by EPA's Risk Management Decision Team. The questions were:

- Where rain water from the drip pad runs off.
- Other major facility drainage points.
- Health and safety procedures that workers take to minimize exposure to exposed soil contamination.
- What the surrounding properties outside the facility are used for.
- Approximate dimensions of unpaved area south of the drip pad.
- What difficulties, if any, would exist in paving under the drip pad treating cylinder.
- Any unusual soil stains in storage area south of the drip pad.

INVESTIGATION

Where rain water from the drip pad runs off.

All liquids on the drip pad run into the door pit. Currently, the drip pad is covered by a roof. Some rain water will blow onto the pad, since the building is completely open on the south and east sides and partially open on the north and west sides. There is a wall on the north side of the building behind the drip tank (photos 19, 20-23). The west side of the drip pad is partially sheltered by the treatment building and door pit area. See photos 13-23.

As shown in photos 13-17, liquids were dripping on the pad from wood treated that morning. The liquids were flowing to the rails, which slope to the door pit. It appears any rainwater that falls onto the pad would follow the same path. A metal berm is installed along the perimeter of the pad (photos 13-17).

According to the facility representative, water from the drip area "used to go mainly to the street" prior to construction of the pad. The construction plans for the roof, provided by Hilo Wood after the site visit, were drawn in January of 1982. The president stated the pad was installed in 1984.

Other major facility drainage points.

See rough surface water flow diagram, Att. #3. In general, it appears surface water flows from the main or upper lot south into the leased lower lot, and then to the north-eastern portion of the lower lot. The water then flows into a dry well located a few feet off-site. Photos 24-30 follows the probable path for rain water on the site.

Photos 24-26 comprise a pan of the lower lot, looking south from just south of the drip pad. In the left portion of the pan is a lighter colored soil patch (just to the right of the plant by the fence). The lighter soil is a patch of dried mud where standing water has evidently accumulated in the past. Photo 27, still looking south, shows the same dried mud patch in more detail. The plant to the left of the photo is the same one visible in photo 24. Photo 28 shows the same mud patch, now looking east to the perimeter fence. Note facility representative and inspector for scale, and the metal grate installed in the bottom of the fence. Photos 29-30, using the same inspector for scale, shows the metal grate in the fence and dried mud indicating flow off site and into a dry well located in the corner of the lot next door.

There are other dry wells spaced along the perimeter of this adjacent lot. During the site visit, the facility representative called the "Department of Hawaii Homes", reportedly the owner of the adjacent lot. He reports "HI Homes" told him the lot was cleared in 1990, the dry wells were installed in 1991, and that the wells are about 30 feet deep.

The president also noted that the "whole lower area becomes a lake" during heavy rains. After the heaviest rains, the lower area takes one to two days to drain. Apparently, much of the off-site paved areas southwest of the facility (see map in photo 1) also drains into the lower lot. Photos 33-34 and 36 show drain pipes leading to the lower lot from the newer Akana Petroleum building south of Hilo Wood. Photo 35, looking south, was taken from Hilo's rear access point in the southwest corner of the lower lot. The photo shows the slope down into the lot (left in the picture) and looks up to the paved areas to the southwest (center and right in the photo) beyond Hilo Wood.

The lower lot reportedly has a layer of about 6" of loose soil on top of "solid lava".

The paved area at the east gate (pan, photos 38-42) drains west and then into the lower lot (photos 44-46).

The aerial photo provided during the site visit also shows dark areas corresponding with the flow from the upper process portion of the facility into the lower lot, then turning to the fence. The photo is dated 7/24/91. Since the aerial photo was taken, another Akana Petroleum building and a fire escape/emergency equipment access road has been placed in the rear of the lower lot. The current usable area of the lower lot is smaller than that depicted in the aerial photo (see discussion below).

Note that the aerial photo is taken from a fairly acute southwest angle, distorting the dimensions of the lower lot area in the foreground. The photo also depicts far greater quantities of wood than were observed on site during this visit.

Health and safety procedures that workers take to minimize exposure to exposed soil contamination.

None were observed. At the time of the site visit, only four people were working at Hilo Wood, including the president and secretary. One person was observed driving a forklift (photo 15). He did not appear to be wearing any protective equipment.

According to the president, employees do have access to respirators, and wear them while mixing the borate. He also stated they have been through the "smoke test" (a basic respirator fit testing procedure).

The president also noted that Permissible Exposure Limit (PEL) monitoring for airborne constituents had been conducted in the past, and no significant potential worker exposures were detected. He estimated the monitoring was conducted in the "late '80s".

What the surrounding properties outside the facility are used for.

The surrounding properties include empty lots, warehousing, petroleum storage and dispensing, and light industrial uses. A sketch showing the land uses of the surrounding area forms Att. #5. Photo 1 shows a sign noted off site that includes a diagram of the area south and west of the facility, and lists the companies occupying the lots.

Photo 2 was taken at the corner of Makaala and Kanoelehua Streets, which form the southeast corner of the block on which Hilo Wood is located. The area was being regraded, evidently to construct a shopping center. Bulldozers, scrapers, and a large mound of stockpiled dirt were noted.

Approximate dimensions of unpaved area south of the drip pad.

The upper portion of the facility has a mix of intact asphalt pavement, older pavement that is broken or badly cracked, and dirt and gravel areas that do not appear to have ever been paved. According to the president, gaps and bubbles in the underlying basalt lava make it difficult to maintain the pavement.

The main (upper) lot is approximately two acres in size. About two-thirds of the upper lot has intact or mostly-intact paving. The area just south of the drip pad has intact paving. The remainder of the main lot south of the drip pad is mostly gravel or older pavement (photo 37). A rough diagram showing the dimensions of the paved areas forms Att. #6.

The entire lower area, about 3/4 of an acre, is unpaved. The lower area is now approximately 225 feet wide (east-west) by 210 feet deep (north-south).

What difficulties, if any, would exist in paving under the drip pad treating cylinder.

The drip pad is already paved. Paving under the treatment cylinder is a mixed proposition. The cylinder is about six feet in diameter and eighty feet long. In most areas that could be observed, the underlying soil is only six to twelve inches from the bottom of the cylinder (see photos 3-11). It would appear that soil would have to be excavated from beneath the cylinder before concrete could be poured. The cylinder is supported by "cradles" (photos 10, 38) which may be undermined by excavation.

Access for paving or pouring concrete under the portion of the cylinder within the treatment building would be difficult. The north wall of the building limits access to that side of the cylinder (photos 3, 9). The area behind the door pit is a network of pipes and valves (photos 4-6), and the control room is in the way on the south side (photos 7, 9).

Excavation and paving/pouring under the exposed rear of the treatment cylinder, where rain can fall on the soil, appears to be more straightforward (photos 10-11A). Access can be obtained from both sides, and it should be possible to support the cylinder during excavation.

Any unusual soil stains in storage area south of the drip pad.

No unusual soil stains were noted in the area south of the drip pad. Treated wood being stored in the lower lot was also examined, and no drippage or seepage in the lower lot was noted. A relatively small area of discolored green soil was noted on the eastern side of the warehouse that is located east of the drip pad (photo 43).

Other Information

Rough time line:

1969 Kamelamela begins at Hilo Wood

1969 Started using penta

1973 Stopped using penta

1973 or 1974 Stopped using FCAP (Fluor, Chrome, Arsenate, Phenol)

1982 Lower area graded, started using lower lot for wood storage

1983 Kamelamela purchases plant

1984 Pad installed

1988 Lease for lower area started

06/28/96 FRI 16:06 FAX 1 415 744 1044 USEPA REGION 09 HRD

1991 Aerial photo taken

1991 Dry wells installed next door

1994 June - Stopped using CCA, started using borates

LIST OF ATTACHMENTS

1. Photographs.

2. Aerial photo of Hilo Wood and adjacent property dated 7/24/91, provided by facility representatives during site visit.

3. Copy of Levine-Fricke drawing titled "Figure 2: Subsurface Soil Sample Analytical Results - June 26, 1995" with process changes and water flow indications added by facility representative during site visit.

4. Historical photos of facility and photo captions provided during site visit.

5. Rough sketch showing land uses near the facility.

6. Rough sketch and annotated photo showing paving and lot dimensions.

ATTACHMENT 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

RECORD OF COMMUNICATION

TO: CLINT SEITER

FROM: TOM KELLY

DATE: 1-31-96

TIME: 3:00

TYPE OF COMMUNICATION: MEETING

ATTENDEES: NONE

COPIES OF THIS COMMUNICATION SENT TO: LILY WONG, ARLENE KABEI, KATHY BAYLOR, PATRICK WILSON, TOM KELLY

SUBJECT: WELLS AND GROUNDWATER IN HILO, HAWAII

ACTION REQUIRED: FOR RECORD PURPOSES ONLY

As a followup to the 1-10-96 meeting with the Risk Management Decision Team (RMDT), Tom Kelly agreed to see what data he could come up with regarding wells in Hilo and the groundwater situation in general.

What Tom found out:

1. The city of Hilo obtains its drinking water from four major municipal wells. The table is as follows:

Well #	Location	Approx yield * (mgd)	Approx % of total Hilo consumption
4003.01	Panaewa 1	2.08	29.5
4003.02	Panaewa 2	2.36	33.8
4003.03	Panaewa 3	0.44	6.2
4306.01	Piihonua A	1.10	15.6
	Surface sources	1.06	15.0

* million gallons per day

None of these wells is closer than two miles from the Hilo Wood Treatment facility. Furthermore, based on surace topography and the proximity of the ocean, the drinking water wells are upgradient from the site. However, this doesn't lessen the concern regarding the potability of the ground water beneath the facility, since there may come a time when it *will* be considered as a possible drinking water source.

There is a cluster of twelve wells in the immediate vicinity of the facility, owned by the local utility power plant, Hawaii Electric Light Co, Inc. None of these wells are used for drinking water, according to the Hawaii Department of Health.

From this information it does not appear that drinking water in the city of Hilo is currently threatened by any potential contamination experienced at the Hilo Wood Treater's site.

If the information is available, we will try to resolve the following questions:

1. What are the specific uses for water drawn from Hawaii Electric Light's wells?

2. Are there currently any indications of contaminants in Hawaii Electric Light's wells?

Tom was also able to obtain the following information:

- The net precipitation for Hilo is 130 inches/year.
- The predominant wind direction is from the west.
- Relative humidity is 70-80%
- The residential population within 1/4 mile of the facility is 31
- There are no rare or endangered species inhabitating within a mile of the facility.

ATT #6

JUL 19 1996

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

JUL 02 1996

Linda Chin
Land Management Division
Department of Hawaiian Home Lands
P.O. Box 1879
Honolulu, HI 96805

Dear Ms. Chin:

Per our teleconference on July 1, 1996, the following represents a brief history of EPA's enforcement action against Hilo Wood Treating Inc.

1.0 Background

Hilo Wood Treating, Inc. operates a commercial wood treating business which pressure treats lumber and plywood with chemical preservatives. One of the chemicals used by the company was Chromated Copper Arsenate (CCA). Waste generated from the CCA treatment process is categorized as an F035 hazardous waste based on its arsenic and chromium content. Hilo generated well over 1000 kg/month of F035 hazardous waste which made it a large quantity generator. The facility is located in Hilo, Hawaii.

The F035 hazardous waste generated by the Facility was in the form of waste CCA preservative solutions and waste waters. These waste solutions and waste waters containing CCA were collected from the process and drip pad areas and recycled for reuse as preservative solution or as makeup water to formulate new preservative solutions. Hazardous waste (F035) in the form of CCA contaminated sludge, dirt and wood chips from the preservative solution storage tanks, treatment cylinders, sumps, and the drip pad were the main wastes that are collected, containerized, and shipped from the Facility for disposal.

1.1 EPA Enforcement Action

On September 8, 1993, the Hawaii Department of Health (HDOH) inspected the facility and found numerous violations of Sections 3002, 3004, and 3005 of the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, and the Code of Federal Regulations, revised as of July 1, 1992. Releases of contaminants were noted in various parts of the facility, but particularly around the drip pad (which had no berm).

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On May 5, 1994 EPA issued a complaint against the facility citing violation of 40 C.F.R. §270.1 (disposal and storage of hazardous waste without a permit). Among other actions, the attached Compliance Order instructed the facility to engage in sampling and analysis in those areas of the facilities most likely to be contaminated.

1.2 Results of Hilo's Sampling and Analysis

Hilo conducted its first round of sampling on August 8, 1994, with subsequent sampling taking place on June 6, 1995. The sampling indicated several "hot spots" for arsenic, i.e., sampling levels substantially above PRG levels (highest level sampled: 54,000 mg/L; PRG for arsenic: 3 mg/L) (See Attachments 1 and 2). However, all but one of the sample sites tested below TCLP for copper, chromium, and arsenic (TCLP refers to Toxicity Characteristic Leaching Procedure - a testing procedure to measure the degree to which contaminants are leaching down through the soil). The one exception was beneath the leaking valve of the pressure treating cylinder, where the TCLP for arsenic measured 36 mg/L (the regulatory threshold level is 5 mg/L).

The depth of soil samplings ranged from ground surface to 4 feet below ground surface (at which level there was still no sign of diminution of contaminants). Groundwater is estimated to be at a depth of around 50 feet. There is no nearby surface water that is at risk of being contaminated by these wastes. The analysis of the samples was for chromium, copper, and arsenic, since the facility used chromated copper arsenate (CCA) to treat wood (it has since switched over to sodium borate, which is not a RCRA regulated substance). No analysis was done for organic wastes since Mr. Kamelamela, the current facility owner, has not used organic products (such as pentachlorophenol) to treat his wood. While the Levine-Fricke representatives did not know for sure whether or not organics were used during the period previous to Mr. Kamelamela's ownership, what evidence exists indicates otherwise, (e.g., there were no odors or soil colorations distinctive to organics.) Mr. Kamelamela will verify this.

The high PRG levels for arsenic indicate arsenic "hot spots", but the generally low TCLP readings suggest that the contaminants are not leaching through the soil. If this is correct, then the risk of ground water contamination is unlikely (particularly in light of the 50 foot depth to ground water and the basalt rock constituency of the ground). However, this is by no means a foregone conclusion. Moreover, there is a credible risk of surface ground toxicity, either through ingestion or inhalation.

1.3 Hilo's Financial Status

EPA has reviewed the balance sheet for Hilo Wood Treating, Inc as of November 30, 1995, an income statement in contribution format for the month ended November 30, 1995 and year to date for the portion of the year ended November 30, 1995 as well as a letter from the president of Hilo Wood Treating, Inc setting forth the chronology of the sale of the facility by Koppers to Hilo Wood Treating, Inc.

EPA's review of the income statement and balance sheet suggests that Hilo Wood Treating, Inc. is marginally profitable, and that the $60,000 which the company has offered to expend over 1995-1996 probably represents a substantial portion of the uncommitted capital available to the company. Any larger expenditure might jeopardize the ability of the business to continue basic business operations.

1.4 The City of Hilo's Drinking Water Supply

The city of Hilo obtains its drinking water from four major municipal wells. The table is as follows:

Well #	Location	Approx yield (mgd)*	Approx % of total Hilo consumption
4003.01	Panaewa 1	2.08	29.5
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4306.01	Piihonua A	1.10	15.6
	Surface sources	1.06	15.0

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None of these wells is closer than two miles from the Hilo Wood Treatment facility. Furthermore, based on surace topography and the proximity of the ocean, the drinking water wells are upgradient from the site. However, this doesn't lessen the concern regarding the potability of the ground water beneath the facility, since there may come a time when it *will* be considered as a possible drinking water source.

There is a cluster of twelve wells in the immediate vicinity of the facility, owned by the local utility power plant, Hawaii Electric Light Co, Inc. None of these wells are used for drinking water, according to the Hawaii Department of Health.

From this information it does not appear that drinking water in

the city of Hilo is currently threatened by any potential contamination experienced at the Hilo Wood Treater's site.

EPA was also able to obtain the following information:

- The net precipitation for Hilo is 130 inches/year.
- The predominant wind direction is from the west.
- Relative humidity is 70-80%
- The residential population within 1/4 mile of the facility is 31
- There are no rare or endangered species inhabiting within a mile of the facility.

2.0 Follow-Up Site Visit By EPA Inspectors

On February 13, 1996, EPA inspectors Barry Cofer and Karou Morimoto visited the facility. Specifically, they were requested to determine (1) where rain water would have most likely run off a bermless drip pad, (2) the location of other facility drainage points, (3) health and safety procedures that workers take to minimize exposure to surface soil contamination, (4) what the properties adjacent to the facility are used for, and (5) the approximate dimensions of the unpaved area south of the drip pad. The inspectors' findings are as follows:

(1) Where does rain water from the drip pad runs off?

All liquids on the drip pad run into the door pit. Currently, the drip pad is covered by a roof. Some rain water will blow onto the pad, since the building is completely open on the south and east sides and partially open on the north and west sides. There is a wall on the north side of the building behind the drip tank. The west side of the drip pad is partially sheltered by the treatment building and door pit area.

Liquids drip on the pad from wood treated. The liquids flow to the rails, which slope to the door pit. It appears any rainwater that falls onto the pad would follow the same path. A metal berm is installed along the perimeter of the pad.

According to the facility representative, water from the drip area "used to go mainly to the street" prior to construction of the pad. The construction plans for the roof, provided by Hilo Wood after the site visit, were drawn in January of 1982. The president stated the pad was installed in 1984.

In general, it appears surface water flows from the main or upper lot south into the leased lower lot, and then to the north-eastern portion of the lower lot. The water then flows into a dry well located a few feet off-site.

There are dry wells spaced along the perimeter of the adjacent lot. The facility representative reports Hawaii Home Lands told him the lot was cleared in 1990, the dry wells were installed in 1991, and that the wells are about 30 feet deep.

The president also noted that the "whole lower area becomes a lake" during heavy rains. After the heaviest rains, the lower area takes one to two days to drain. Apparently, much of the off-site paved areas southwest of the facility also drains into the lower lot. The lower lot reportedly has a layer of about 6" of loose soil on top of "solid lava". The paved area at the east gate drains west and then into the lower lot.

(2) Health and safety procedures that workers take to minimize exposure to exposed soil contamination.

None were observed. At the time of the site visit, only four people were working at Hilo Wood, including the president and secretary. One person was observed driving a forklift He did not appear to be wearing any protective equipment.

According to the president, employees do have access to respirators, and wear them while mixing the borate. He also stated they have been through the "smoke test" (a basic respirator fit testing procedure).

The president also noted that Permissible Exposure Limit (PEL) monitoring for airborne constituents had been conducted in the past, and no significant potential worker exposures were detected. He estimated the monitoring was conducted in the "late '80s".

(3) What the surrounding properties outside the facility are used for.

The surrounding properties include empty lots, warehousing, petroleum storage and dispensing, and light industrial uses.

The corner of Makaala and Kanoelehua Streets forms the southeast corner of the block on which Hilo Wood is located. The area was being regraded, evidently to construct a shopping center. Bulldozers, scrapers, and a large mound of stockpiled dirt were noted.

(4) Approximate dimensions of unpaved area south of the drip pad.

The upper portion of the facility has a mix of intact asphalt pavement, older pavement that is broken or badly cracked, and dirt and gravel areas that do not appear to have ever been paved. According to the president, gaps and bubbles in the underlying basalt lava make it difficult to maintain the pavement.

ATTACHMENT 1

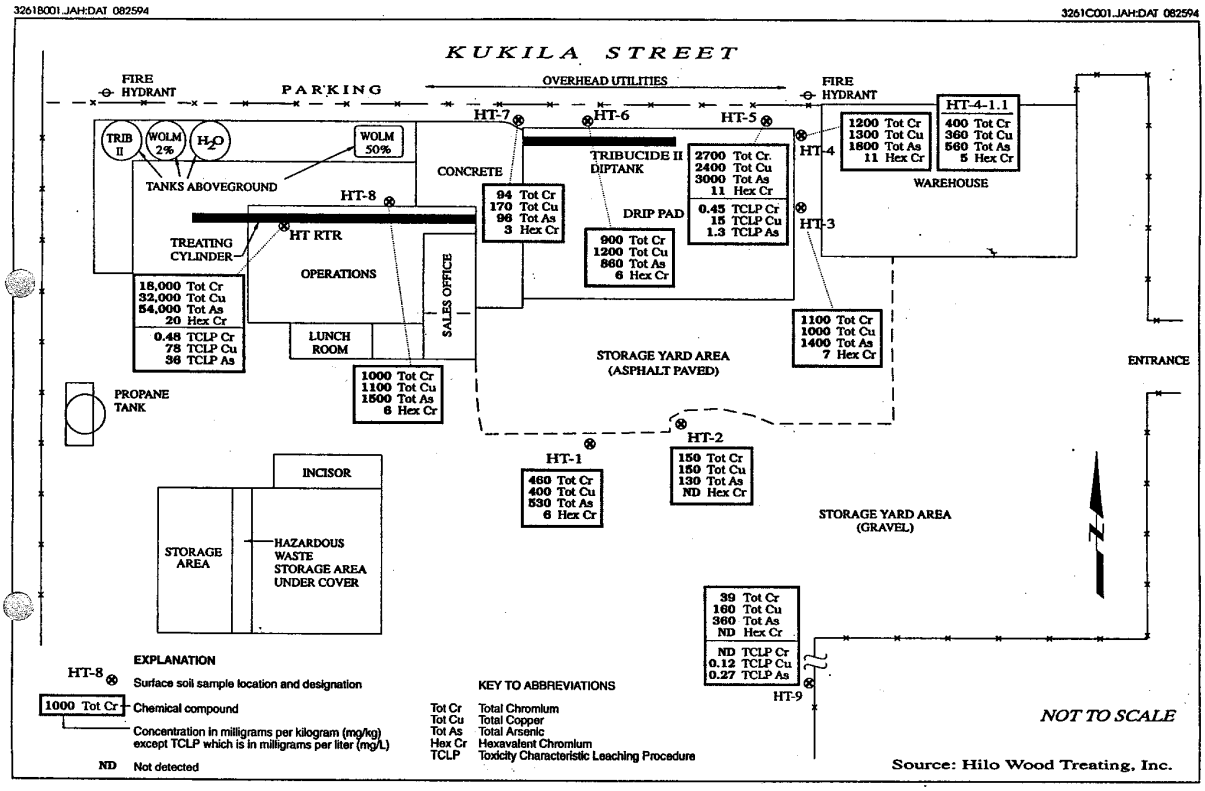

Figure 2 : LOCATIONS OF SURFACE SOIL SAMPLES COLLECTED ON AUGUST 8, 1994 AND RESULTS OF LABORATORY ANALYSIS

Project No. 3261

LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS, & APPLIED SCIENTISTS

The main (upper) lot is approximately two acres in size. About two-thirds of the upper lot has intact or mostly-intact paving. The area just south of the drip pad has intact paving. The remainder of the main lot south of the drip pad is mostly gravel or older pavement.

The entire lower area, about 3/4 of an acre, is unpaved. The lower area is now approximately 225 feet wide (east-west) by 210 feet deep (north-south).

(5) What difficulties, if any, would exist in paving under the drip pad treating cylinder.

The drip pad is already paved. Paving under the treatment cylinder is a mixed proposition. The cylinder is about six feet in diameter and eighty feet long. In most areas that could be observed, the underlying soil is only six to twelve inches from the bottom of the cylinder. It would appear that soil would have to be excavated from beneath the cylinder before concrete could be poured. The cylinder is supported by "cradles" which may be undermined by excavation.

Access for paving or pouring concrete under the portion of the cylinder within the treatment building would be difficult. The north wall of the building limits access to that side of the cylinder. The area behind the door pit is a network of pipes and valves, and the control room is in the way on the south side.

Excavation and paving/pouring under the exposed rear of the treatment cylinder, where rain can fall on the soil, appears to be more straightforward. Access can be obtained from both sides, and it should be possible to support the cylinder during excavation.

If you have any questions or comments regarding this report, please contact me at (415) 744-2141. Thank you.

Sincerely,

Clint Seiter
RCRA Compliance Monitoring and Enforcement Section

Enclosure

cc: Paul Kalaiwaa, HDOH
Arlene Kabei, EPA

JOHN WAIHEE
GOVERNOR OF HAWAII

JOHN C. LEWIN, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
ENVIRONMENTAL MANAGEMENT DIVISION
FIVE WATERFRONT PLAZA, SUITE 250
500 ALA MOANA BOULEVARD
HONOLULU, HAWAII 96813

In reply, please refer to:
EMD / SHW

March 15, 1994

U0329CL
Facility I.D. 9-600657

Mr. Roy Sonomura
M. Sonomura Contracting Co., Inc.
100 Kukila Street
Hilo, Hawaii 96720

Dear Mr. Sonomura:

Subject: Review of Environmental Assessment for M. Sonomura Contracting Co., Inc., 100 Kukila Street, Hilo, December 29, 1993

The Department of Health (DOH) has reviewed the subject report prepared by Unitek Environmental Consultants, Inc.. The report was prepared in response to the removal of two 550-gallon gasoline underground storage tanks (USTs) and one 1,000-gallon diesel UST. Please note that the submitted report has been included as part of the public record file for this UST facility.

Since there were no visual or olfactory indications of a release reported and laboratory analysis determined contaminant levels to be below detectable levels, we agree with your consultant's conclusion that no further investigation of the soil in the vicinity of the former USTs is necessary. However, you should be aware that if future evidence indicates that there may be contamination at the site that exceeds our recommended cleanup criteria, DOH may require you to undertake additional investigative and/or cleanup actions.

In order to complete the evaluation of your UST closure, some additional is necessary. **Please submit the following to DOH within 45 days of the date of this letter:**

- A description or citation of procedures followed to clean UST and associated piping;
- A description or citation of procedures followed to pump out and recycle or dispose of all product, sludge, and rinsate;
- Manifests for sludge and rinsate; and
- Information concerning the UST disposal facility, including a manifest stating company name, address, and date tanks and piping were disposed of.

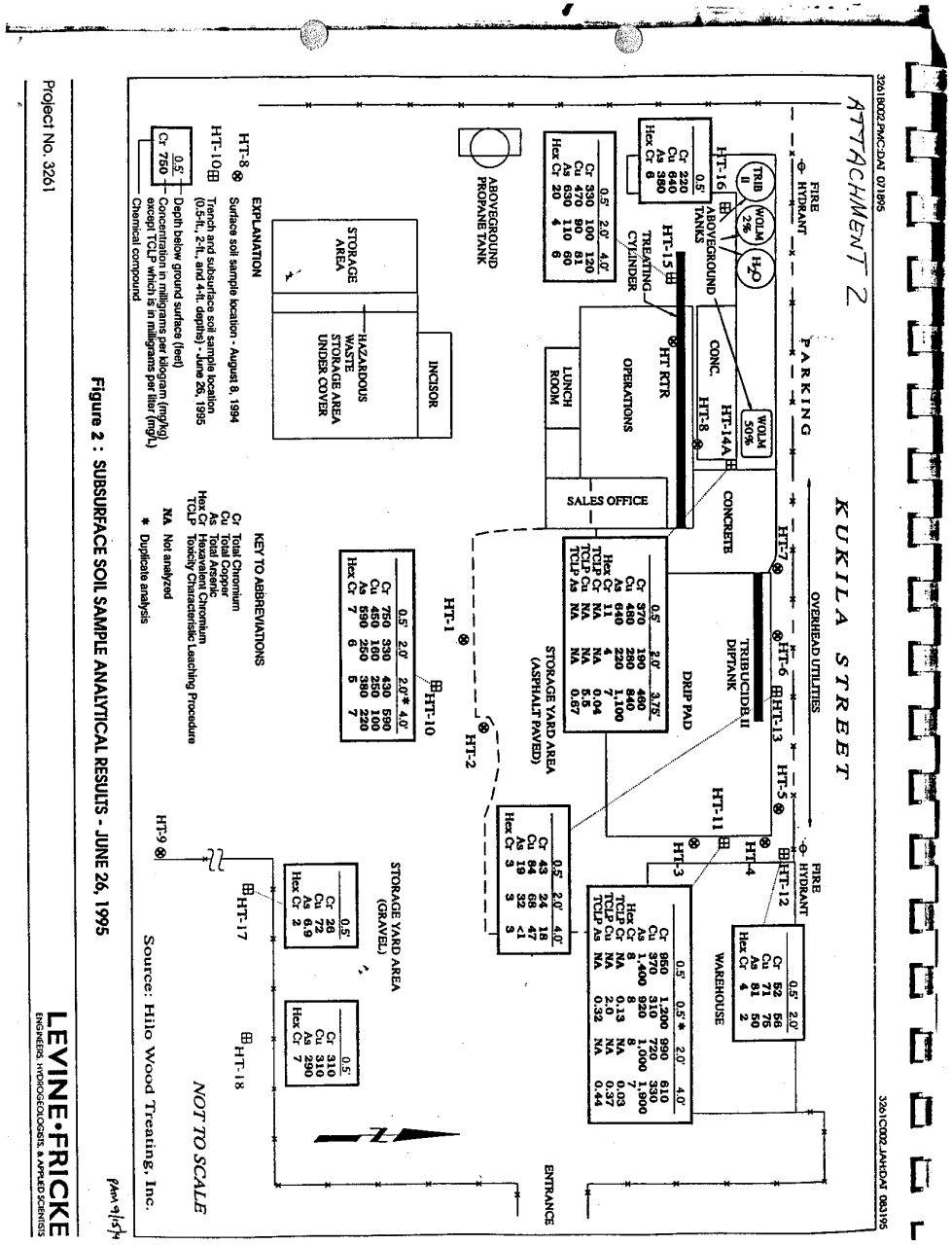

Figure 2 : SUBSURFACE SOIL SAMPLE ANALYTICAL RESULTS - JUNE 26, 1995

Project No. 3261

LEVINE•FRICKE
ENGINEERS, HYDROGEOLOGISTS, & APPLIED SCIENTISTS

Should you or your staff have any questions concerning our review of this report, please contact Mr. Charley Langer of our Underground Storage Tank Section at 586-4246.

Sincerely,

STEVEN Y.K. CHANG, P.E., MANAGER
Solid and Hazardous Waste Branch

SYKC:CL:jtc:210:320

c: Russ Beckwith, EPA Region IX, San Francisco

APPENDIX C. COUNTY OF HAWAI'I REAL PROPERTY TAX RECORDS

HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470590000

50 KUKILA STREET **AKANA PETROLEUM INC**

Parcel Data

Site Address	50 KUKILA STREET
Unit No.	
Property Class	INDUSTRIAL
Zoning	Call the Planning Department at (808) 961-8288.

Owner

Owner	Address	City	State	Country	Zip Code
HAWAIIAN HOME LANDS					
AKANA PETROLEUM INC	50 KUKILA ST	HILO	HI		96720

Data Last Modified : 9/12/2008

DISCLAIMER

This site was designed to provide quick and easy access to real property tax assessment records and maps for properties located in the County of Hawai'i and related general information about real property tax procedures. Listed information does not include all of the information about every property located in this County. Information and answers to the most commonly asked questions from members of the general public have been provided. The information on this site is subject to daily changes; time permitting, we normally refresh the data on this site on a weekly basis. All of the information listed on this site was prepared exclusively for tax assessment purposes. Users must understand that the property information and descriptions may change at any time. Persons using this data should NOT rely upon this information in formulating important decisions that affect their financial future nor should this information be considered as legal documentation. No warranties, expressed or implied, are provided for the data herein, its use or its interpretation. Utilization of the search facility indicates understanding and acceptance of this statement by the user.
Thank you.

Last Updated: 9/12/2008
Printed on Wednesday, September 17, 2008, at 4:57:54 PM EST

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HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470590000

50 KUKILA STREET **AKANA PETROLEUM INC**

Sales

Sale Amount	Recordation Date	Instrument #	Land Court Doc#	Transfer Certificate of Title#	Instrument Date
	12/22/2005				12/22/2005
	08/24/2004				08/24/2004
	08/23/2004				07/14/2004
					06/02/2004
		0000000000			06/23/1999
	03/19/1996	9600037419			12/15/1995

Data Last Modified : 9/12/2008

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Thank you.

Last Updated: 9/12/2008
Printed on Wednesday, September 17, 2008, at 4:58:40 PM EST

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HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470590000

50 KUKILA STREET **AKANA PETROLEUM INC**

Land

Property Class	Square Feet	Acreage	Agricultural Use
	75882	1.742	

Data Last Modified : 9/12/2008

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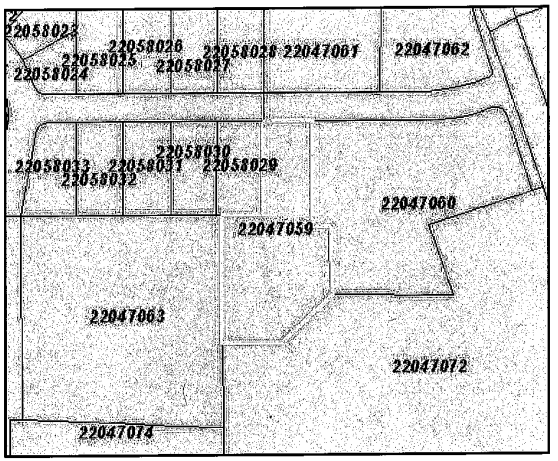
HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

22047059

n/a **n/a**



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12/22/2005
INSTR-DESC: Mapping Change
TRANS NO: 2380432
INSTR-DATE: 12/22/2005
REC-DATE: 12/22/2005

AREA: 1.7420 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

INSTR: CONS & RESUBD PLNG DEPT #05-000175
FROM: 2247-67 1.00 AC LOT 2
-68 1.00 AC LOT 3
-71 1.984 AC LOT 1
-72 6.500 AC LOT 5-A
CONS LOTS 1,2,3,5-A & D-2-A & RESUBD INTO
LOTS 5-A-1 & 5-A-2, PER PLAN BY IMATA & ASSOC INC.,
APPROVED 12/22/05
TO: 2247-72 15.574 AC LOT 5-A-1
F/D: AREA, BDRY, LOT 5-A-2
NOTE: DHHL GL 102 TO AKANA PETROLEUM INC TO
BE AMENDED OVER 1.742 AC; AMEND FORTHCOMING PER DHHL
LOT 5-A-2 1.742 AC

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

FOR ASSESSMENT YEAR 2008				
PITT 4	LAND VALUE:	$849,900	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$86,200	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 2007				
PITT 4	LAND VALUE:	$728,500	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$72,900	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 2006				
PITT 4	LAND VALUE:	$607,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$69,600	EXEMPT BUILDING VALUE:	$0

SITE ADDRESS: 50 KUKILA STREET

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720

08/24/2004
INSTR-DESC: ROUTE SLIP
TRANS NO: 2346605
INSTR-DATE: 08/24/2004
REC-DATE: 08/24/2004

AREA: 6.8320 ACRES

DHHL - AMENDMENT OF GENERAL LEASE 102
FROM: DHHL
TO: AKANA PETROLEUM INC
TMK NO (3) 2-2-47-59
AREA: REDUCE FROM 8.907 AC TO 6.832 AC
RENTAL: $72407.25 EFF 6/2/004
TERM: 40 YRS EXPIRING 3/11/2006
EFF DATE: 6/2/04
PURPOSE: INDUSTRIAL USE
F/D: KEYED ONLY - TERMS OF LEASE
LOT D-2-A 6.832 AC

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				

7 0011 AKANA PETROLEUM INC

FOR ASSESSMENT YEAR 2005				
PITT 4	LAND VALUE:	$1,190,400	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$416,000	EXEMPT BUILDING VALUE:	$0

SITE ADDRESS: 50 KUKILA STREET

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720

08/23/2004
INSTR-DESC: ROUTE SLIP
TRANS NO: 2346584
INSTR-DATE: 07/14/2004
REC-DATE: 08/23/2004

AREA: 6.8320 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

TMKS: 2-2-047-059 & 072
INST: DHHL - 3RD AMENDMENT TO GENERAL LEASE NO 102
AKANA PETROLEUM INC, A HAWAII CORP, (LESSEE) SURRENDERS
POR OF LEASED PREMISES (2247-72) TO DHHL (LESSOR)
EFF DATE OF AMENDMENT IS 6/2/04; REMAINING PREMISES SUBJ
TO LEASE SHALL CONSIST OF 6.832 AC (2247-59)
F/D: KEYED ONLY - AMEND LEASE
LOT D-2-A 6.832 AC

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

SITE ADDRESS: 50 KUKILA STREET

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720 0000

06/02/2004
INSTR-DESC: Mapping Change
TRANS NO: 2346018
INSTR-DATE: 06/02/2004

AREA: 6.8320 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

INSTR: CONS & RESUBD PLNG DEPT #7808
FROM: 2247-72 4.425 AC LOT 5
CONS LOTS D-2 & 5 & RESUBD INTO LOTS D-2-A & 5-A PER
PLAN BY INABA ENGINEERING INC., APPROVED 06/02/2004
TO: 2247-72 6.500 AC LOT 5-A
F/D: AREA, BDRY, LOT D-2-A
LOT D-2-A 6.832 AC

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

SITE ADDRESS: 50 KUKILA STREET

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720 0000

06/23/1999
INSTR-DESC: DHHL - GENERAL LEASE NO 102 TRANS NO: 84988
INSTR_NO:0000000000 INSTR-DATE: 06/23/1999

AREA: 8.9070 ACRES

(0.792 AC) DROPPED INTO 2247-60 PER CSF NOS 22741 & 22742 DT
D 7/23/98
FROM: DHHL TO: AKANA PETROLEUM INC
- 50 KUKILA ST
- HILO, HI 96720
PREMISES & LOCATION: PANAEWA, SO HILO 8.907 AC TMK: 2-2-
47-59
RENTAL: $94,398.64
TERM: 40 YEARS
EFFECTIVE DATE: 3/2/66 - 3/1/06
PURPOSE: LOT SIZE FROM 9.699 AC TO 8.907 AC; A REDUCTION OF
0.792 AC
EFFECTIVE 10/01/97
F/D: AREA, BDRY, LOT D-2

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

FOR ASSESSMENT YEAR 2004				
PITT 4	LAND VALUE:	$892,800	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$392,800	EXEMPT BUILDING VALUE:	$0
THE ABOVE IS THE AMENDED ASSESSMENT FOR THIS YEAR				
FOR ASSESSMENT YEAR 2003				
PITT 4	LAND VALUE:	$1,164,000	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$386,900	EXEMPT BUILDING VALUE:	$0
THE ABOVE IS THE AMENDED ASSESSMENT FOR THIS YEAR				
FOR ASSESSMENT YEAR 2002				
PITT 4	LAND VALUE:	$1,164,000	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$379,300	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 2001				
PITT 4	LAND VALUE:	$1,164,000	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$379,300	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 2000				
PITT 4	LAND VALUE:	$1,164,000	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$383,700	EXEMPT BUILDING VALUE:	$0

SITE ADDRESS: 50 KUKILA ST

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720 0000

03/19/1996
INSTR-DESC: GRANT OF EASEMENT TRANS NO: 84987
INSTR_NO:9600037419 INSTR-DATE: 12/15/1995
REC-DATE: 03/19/1996

AREA: 9.6990 ACRES

FROM: STATE OF HAWAII; AKANA PETROLEUM INC & HONSADOR INC
TO: WAIAKEA CENTER INC
GRANTEE DESIRES AN ESMT OVER THE SAW MILL SITE RESTRICTING T
HE PLACEMENT
OF BLDGS & IMPROVEMENTS WITHIN THE ESMT AREA IN THE SAW MILL
SITE.
GRANTOR GRANT UNTO GRANTEE A NONEXCLUSIVE ESMT OVER & ACROSS

POR OF THE
SAW MILL SITE DESC IN EXH "A"; UNTIL 4/14/2056 OR UNTIL SUCH
TIME AS
GRANTEE, ITS SUCCESSORS OR ASSIGNS, AGREES TO THE CANCELLATI
ON OF THIS
GRANT OF ESMT, WHICHEVER OCCURS EARLIER.
NO BUILD ESMT 2 POR GEN LE HHL NO. 102 SAW MILL SITE 3,
105 SF DES
F/D: SUBJ TO ESMT "2" {3,105 SF} IN FAVOR OF TMK 2247-70

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

FOR ASSESSMENT YEAR 1999				
PITT 4	LAND VALUE:	$1,267,400	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$399,900	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1998				
PITT 4	LAND VALUE:	$1,267,400	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$441,400	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1997				
PITT 4	LAND VALUE:	$1,267,400	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$419,800	EXEMPT BUILDING VALUE:	$0

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720 0000

10/07/1987

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				
7 0011	AKANA PETROLEUM INC				

FOR ASSESSMENT YEAR 1996				
PITT 4	LAND VALUE:	$1,267,500	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$425,000	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1995				
PITT 4	LAND VALUE:	$1,267,500	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$446,200	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1994				
PITT 4	LAND VALUE:	$359,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$453,000	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1993				
PITT 4	LAND VALUE:	$359,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$413,000	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1992				
PITT 4	LAND VALUE:	$359,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$262,100	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1991				
PITT 4	LAND VALUE:	$359,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$262,100	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR 1990				
PITT 4	LAND VALUE:	$359,100	EXEMPT LAND VALUE:	$0
	BUILDING VALUE:	$297,800	EXEMPT BUILDING VALUE:	$0

COUNTY OF HAWAI'I PARCEL HISTORY (TT101) FOR:

TMK: 2-2-047-059-0000 PAGE: 5

FOR ASSESSMENT YEAR 1989
PITT 4 LAND VALUE: $359,100 EXEMPT LAND VALUE: $0
BUILDING VALUE: $130,900 EXEMPT BUILDING VALUE: $0

FOR ASSESSMENT YEAR 1988
PITT 4 LAND VALUE: $359,115 EXEMPT LAND VALUE: $0
BUILDING VALUE: $130,889 EXEMPT BUILDING VALUE: $0

MAILING ADDRESS: AKANA PETROLEUM INC
50 KUKILA ST
HILO HI 96720 0000

------------------SEE PARCEL SHEETS FOR MORE INFORMATION------------------

DEPARTMENTAL FORM P-26

RESIDENTIAL APPRAISAL CARD

CARD ___ OF ___ CARDS

ZONE	SEC.	PLAT	PARCEL
2	2	47	59

1. TOPOGRAPHY	2. ST. IMPVTS	3. UTILITIES	4. USE	5. ADD'L L. IMPVTS
LEVEL ☐	GRAVEL ☐	WATER ☐	RES. ☐	PAVED AREAS ☐
SLOPING FT.	PAVED ☐	ELEC. ☐	COM'L ☐	RET. WALLS ☐ TERR/PATIOS ___ SQ. FT.
GRADE "	CURB ☐	GAS ☐	IND. ☐	LAWN-LDSC. ☐ FENCES ___ LIN. FT.
H ☐ L ☐	GUTTER ☐	SEWER ☐	AGR. ☐	WALK WAYS ☐
	SIDE WK ☐	UNDERG'D ☐	INST. ☐	SPRINKLERS ☐ BARBEC. ___ CU. FT.
				SWIM. POOL ___ SQ. FT.
				SHAPE ___

6.
7. ___ ADDR
8. ZONING ___
9. MOD. FACTOR ___
ST. DEPTH ___ CORNER ___
OTHER ___

DESCRIPTION: HHL ~~G/L HHL #102~~ Por of Panaewa Tract I Waiakea, So. Hilo

OWNER	TITLE HISTORY	NET AREA
~~Hawaiian Home Lands~~	For 1967 9.699 ac fr par-01 same owner	9.699 ac.
~~(Canadian Pacific Corp.)~~ HHL	HHL G/L#102 3/2/66 for 40 yrs @$10,246 ann for Saw Mill Site	
Hawaiian Home Lands	Canc/HHL G/L#102 10/23/69 TMB 1410'71	
~~(Campbell-Burns Wood Products Inc)~~Le	HHL B/L #102 reissued November 7, 1969 under the same terms & conditions as original issued. TMB#12140'71-72	9.699 Ac
~~(Hawaiian Timber Products Inc) le~~	R/S3/8/77 Correction of Lessee to Hawn Timber Products, Inc. Info fr Steve Kuna, Legal Sec., HHL TMB2568'77	
	Per Tax Maps 1/15/84 fr Dept of Hawn Home Lands Lease Amendment of Rentto Hawn Timber Products Inc Purpose:Ind purpose only Rental/Term:$44,000 per annum eff date: 12/1/84 (KEYED ONLY-Amend Terms) TMB'15243'84	
(Akana Petroleum, Inc.) Le HHLL 102	Assmt/Le: 5/10/85 fr Hawn Timber Products, Inc. (fka Canadian Pacific Corporation) SCT$70.00 R: 7/31/85 Liber 18817/747 TMB 8812'1985.	

For zone pr to par 12

Adj. by B/R Date: 10/15/84 Sustained

YEAR	1982	1983	1984	1985	1986	1987
AREA						
LAND	215469	359115	359115	359115	359115	359115
IMP.	184448	325858	323756	129501	128955	129768
TOT.	399917	684973	682871	488616	488070	488883
EX.	—	—	—	—	—	—
NET	399917	684973	682871	488616	488070	488883
TAX						

DIVISION			
ZONE	SEC.	PLAT.	PARCEL
2	2	47	59

4 - 4

YEAR	1966	1967	1968	1969	1970	71–72	72 – 73	73-74
AREA	9.699 ac							
LAND VALUE	119353	119353	119353	119353 / 119353	119353 / 119353	133084 / 147871	133084	147871
IMPROVEMENT	–	21340	21100	46614 / 47661	49810 / 49810	54068 / 54068	54921	97704
TOTAL	119353	140693	140453	165967 / 167014	169163 / 169163	187152 / 187152	188005	245575
LESS EX.		–	–					–
NET TAX VALUE	119353	140693	140453	165967 / 167014	169163 / 169163	187152 / 187152	188005	245575
TAXES	Dr. Adj. Date: 1/30/67							

YEAR	74-75	75-76	76 - 77	1977	1978	1979	1980	1981
AREA								
LAND VALUE	147871	147871	177445	126746	139421	139421	194044	206005
IMPROVEMENT	110617	125245	107348		129840	164714	164503	164225
TOTAL	258488	273116	284793		269261	304135	358847	370230
LESS EX.		–			–			–
NET TAX VALUE	258488	273116	284793		269261	304135	358847	370230
TAXES								

HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470720000

NA **HAWAIIAN HOME LANDS**

Parcel Data

Site Address	
Unit No.	
Property Class	INDUSTRIAL
Zoning	Call the Planning Department at (808) 961-8288.

Owner

Owner	Address	City	State	Country	Zip Code
HAWAIIAN HOME LANDS					

Data Last Modified : 9/12/2008

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HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470720000

NA **HAWAIIAN HOME LANDS**

Sales

Sale Amount	Recordation Date	Instrument #	Land Court Doc#	Transfer Certificate of Title#	Instrument Date
	12/22/2005				12/22/2005
	08/23/2004				07/14/2004
					06/02/2004
	03/19/1996	9600037418			12/21/1995
	12/06/1995	9500158073			10/31/1995

Data Last Modified : 9/12/2008

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HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

220470720000

NA **HAWAIIAN HOME LANDS**

Land

Property Class	Square Feet	Acreage	Agricultural Use
	678403	15.574	

Data Last Modified : 9/12/2008

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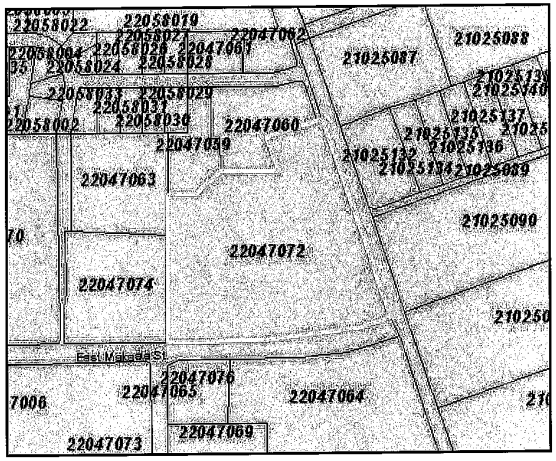
HAWAII COUNTY
REAL PROPERTY
TAX OFFICE

22047072

n/a n/a



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COUNTY OF HAWAI'I PARCEL HISTORY (TT101) FOR:
TMK: 2-2-047-072-0000 PAGE: 1

12/22/2005
INSTR-DESC: Mapping Change
TRANS NO: 2380432
INSTR-DATE: 12/22/2005
REC-DATE: 12/22/2005

AREA: 15.5740 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

INSTR: CONS & RESUBD PLNG DEPT #05-000175
TO: 2247-59 6.500 AC LOT 5-A
FROM: 2247-59 15.574 AC LOT 5-A-1
F/D: AREA, BDRY, LOT 5-A-1

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				

FOR ASSESSMENT YEAR 2008				
PITT 4	LAND VALUE:	$5,698,600	EXEMPT LAND VALUE:	$5,698,600
	BUILDING VALUE:	$506,500	EXEMPT BUILDING VALUE:	$506,500
FOR ASSESSMENT YEAR 2007				
PITT 4	LAND VALUE:	$4,070,400	EXEMPT LAND VALUE:	$4,070,400
	BUILDING VALUE:	$462,700	EXEMPT BUILDING VALUE:	$462,700
FOR ASSESSMENT YEAR 2006				
PITT 4	LAND VALUE:	$3,392,000	EXEMPT LAND VALUE:	$3,392,000
	BUILDING VALUE:	$440,000	EXEMPT BUILDING VALUE:	$440,000

06/02/2004
INSTR-DESC: ROUTE SLIP
TRANS NO: 2346584
INSTR-DATE: 07/14/2004
REC-DATE: 08/23/2004

AREA: 6.5000 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

TMKS: 2-2-047-059 & 072
INST: DHHL - 3RD AMENDMENT TO GENERAL LEASE NO 102
AKANA PETROLEUM INC, A HAWAII CORP, (LESSEE) SURRENDERS
POR OF LEASED PREMISES (2247-72) TO DHHL (LESSOR)
EFF DATE OF AMENDMENT IS 6/2/04; REMAINING PREMISES SUBJ
TO LEASE SHALL CONSIST OF 6.832 AC (2247-59)
F/D: CLEAR TITLE - LESSEE OUT
LOT 5-A 6.5 AC

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				UNDIVIDED INTEREST

FOR ASSESSMENT YEAR 2005				
PITT 4	LAND VALUE:	$2,265,100	EXEMPT LAND VALUE:	$2,265,100
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0

SITE ADDRESS: 377 MAKAALA STREET

06/02/2004
INSTR-DESC: Mapping Change
TRANS NO: 2346018
INSTR-DATE: 06/02/2004

AREA: 6.5000 ACRES
OTHER-TMKS: 2-2-047-059-0000 ETC.

INSTR: CONS & RESUBD PLNG DEPT #7808
TO: 2247-59 4.425 AC LOT 5 FROM: 2247-59 6.500 AC LOT 5-A F/D: AREA, BDRY, LOT 5-A

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC

2 0011	HAWAIIAN HOME LANDS	UNDIVIDED INTEREST
2 0021	HAWAIIAN HOMELANDS	UNDIVIDED INTEREST
7 0011	AKANA PETROLEUM INC	UNDIVIDED INTEREST

SITE ADDRESS: 377 MAKAALA STREET

03/19/1996
INSTR-DESC: GRANT OF EASEMENT
INSTR_NO:9600037418
TRANS NO: 85033
INSTR-DATE: 12/21/1995
REC-DATE: 03/19/1996

AREA: 4.4250 ACRES

FROM: STATE OF HAWAII
TO: WAIAKEA CENTER INC
GRANTEE DESIRES AN ESMT OVER LOT 5, RESTRICTING PLACEMENT OF BLDGS &
IMPROVEMENTS WITHIN ESMT AREA IN LOT 5. GRANTOR GRANT UNTO GRANTEE A
NONEXCLUSIVE ESMT OVER & ACROSS POR OF LOT 5 DESC IN EXH "A"
; UNTIL
R UNTIL SUCH TIME AS GRANTEE, ITS SUCCESSORS OR A
SSIGNS,
AGREES TO THE CANCELLATION OF THIS GRANT OF ESMT, WHICHEVER OCCURS
EARLIER.
NO BUILD ESMT 1 POR LOT 5 1,879 SF DES
F/D: SUBJ TO ESMT "1" {1,879 SF} IN FAVOR OF TMK 2247-70

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				

FOR ASSESSMENT YEAR	2004			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	2003			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	2002			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	2001			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	2000			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	1999			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	1998			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0
FOR ASSESSMENT YEAR	1997			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0

MAILING ADDRESS: HAWAIIAN HOME LANDS
>
>

12/06/1995
INSTR-DESC: 2ND AMD TO PKG ESMT NO. 1
INSTR_NO:9500158073
TRANS NO: 85032
INSTR-DATE: 10/31/1995
REC-DATE: 12/06/1995

AREA: 4.4250 ACRES

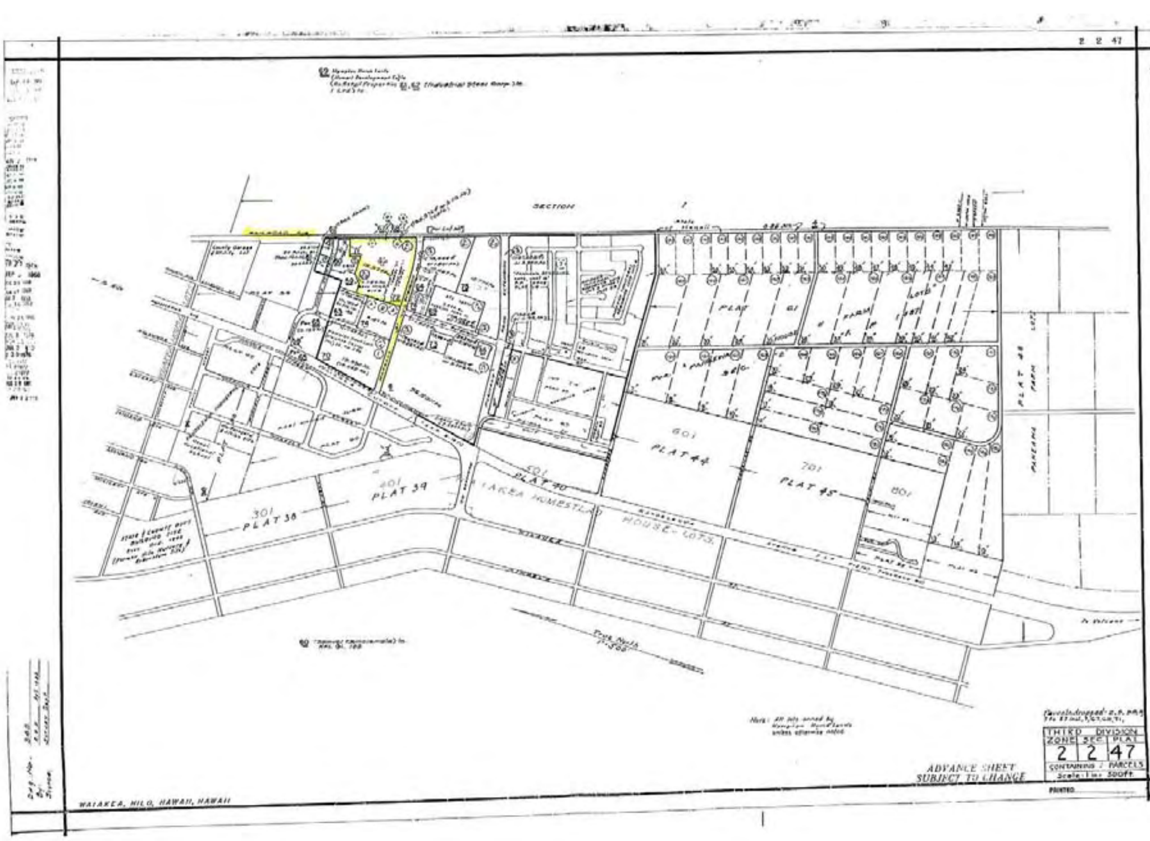
FROM: 2247-64 4.425 AC NEW
TMB NOTE: PLAN BY ENGINEERING SURVEYORS HAWAII INC APPROVED 12/13/93
ON FILE.
F/D: NEW; LOT 5

GROUP#	NAME	F	TC	%-OWNER	TITLE-DESC
2 0011	HAWAIIAN HOME LANDS				

FOR ASSESSMENT YEAR	1996			
PITT 4	LAND VALUE:	$1,156,500	EXEMPT LAND VALUE:	$1,156,500
	BUILDING VALUE:	$0	EXEMPT BUILDING VALUE:	$0

----------SEE PARCEL SHEETS FOR MORE INFORMATION----------

APPENDIX D. MEMORANDUM OF FINDINGS



MEMORANDUM

Group 70 International, Inc. Sustainable Development • Architecture • Planning & Environmental Services • Interior Design • Assets Management
925 Bethel Street, Fifth Floor • Honolulu, Hawai'i 96813-4307 • PH: (808) 523-5866 • FAX: (808) 523-5874

GROUP 70 INTERNATIONAL

Francis S. Oda, Arch.D., FAIA, AICP
Norman G.Y. Hong, AIA
Sheryl B. Seaman, AIA, ASID
Hitoshi Hida, AIA
Roy H. Nihei, AIA, CSI
Ralph E. Portmore, AICP
James I. Nishimoto, AIA
Stephen Yuen, AIA
Linda C. Miki, AIA
George I. Atta, AICP
Charles Y. Kaneshiro, AIA, LEED AP
Jeffrey H. Overton, AICP, LEED AP
Christine Mendes Ruotola, AICP
James L. Stone, AIA, LEED AP
Paul Bierman-Lytle, M. Arch., AIA, LEED AP
Katherine M. MacNeil, AIA, LEED AP
Tom Young, AIA

TO:	Department of Hawaiian Home Lands Land Management Division P. O. Box 1879 Honolulu, Hawai'i 96805		
ATTENTION:	Peter "Kahana" Albinio, Jr., Property Development Agent		
DATE:	September 18, 2008		
PROJECT:	DHHL East Maka'ala, Hilo	**PROJECT NO:**	28054-01 002
E-MAIL/ FAX:	808-620-9479	**NO. OF PAGES:**	
SUBJECT:	Phase I Environmental Site Assessment		

Dear Mr. Albinio,

This memorandum is to update DHHL on the findings discovered thus far in regards to the Phase I Environmental Site Assessment (ESA) requested to be conducted for the DHHL East Maka'ala Property located in Hilo, Hawai'i.

During records review at the State of Hawai'i Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB) and Hazard Evaluation Emergency Response Office (HEER), records were reviewed for the Hilo Wood Treating Company which is the property located directly north of the subject property. Based on activities that historically had taken place at Hilo Wood Treating records reviewed identified that sampling data collected identified Arsenic, Chromium, and Copper, and Hexavalent Chromium in the soil. A statement of work proposed by Levine –Fricke recommended additional sample collections to determine and evaluate the extent of vertical and horizontal contamination of Chromium, Copper and Arsenic above background levels at the Hilo Wood Treating Facility in order to develop an effective remediation plan. Additional Documentation reviewed at DOH requested that Hilo Wood Treating Company inform adjacent property owners that past releases from the facility have contaminated their property and that DHHL owns the adjacent vacant property to the south of the Hilo Wood Treating facility. Dated documentation reviewed at DOH ended in the late 90's and no other documentation on additional actions taken at the Hilo Wood Treating facility were available at DOH.

Following approval by DHHL a phone conversation was held with Mr. Akana of Akana Petroleum, the current main Leassee on the Subject DHHL Property. During this phone conversation Mr. Akana provided information that Akana Petroleum had hired Will Chee Planning and Environmental to conduct a Phase I ESA in 2004/2005, and that based on findings in the Phase I ESA a Phase II ESA was recommended and conducted. Mr. Akana also stated that the Lawyers of the parent company to Hawaiian Petroleum (Salchex Alaska) have the Phase II ESA document and that it had not been released to Mr. Akana.

UNLESS WRITTEN OBJECTION IS RECEIVED WITHIN SEVEN DAYS, WE ASSUME STATEMENTS CONTAINED WITHIN ARE ACCEPTED

During the site visit conducted by Group 70 Mr. Akana provided the Phase I ESA that was prepared by Will Chee for our review. The conclusion of the Phase I ESA states: "Although Hilo Wood Treating had complied with EPA enforcement action and has covered the arsenic contamination areas with an asphaltic concrete cap, the arsenic contamination still exists under the cap. There was some indication of soil sampling conducted by Hilo Wood Treating that the subject property (DHHL) has been impacted from operations at the Hilo Wood Treating facility. Will Chee recommended an additional round of independent sampling be conducted on the property between Hilo Wood Treating and Akana Petroleum to determine the full extent of surface soil contamination and that the samples should be analyzed for total Arsenic, Chromium, and Copper. Based on analytical results from the soil sampling event, course of action should be established to remediate the site, perform a Human Health and Ecological Risk Assessment or both as warranted."

Mr. Akana shared with us that the Phase II ESA was conducted by Marina L. Talisayan, Project Geologist with the company Bureau Veritas North America, Inc., located in Kailua, Hawai'i. No documentation was available to review regarding the completed Phase II ESA.

At this point in time Group 70 suggests that DHHL contact Mr. Akana, Will Chee Planning and Environmental, and Bureau Veritas North America, Inc., to request copies of the Phase I ESA and Phase II ESA that were conducted on the subject property. Following collection of documentation already completed, if DHHL wishes for Group 70 to continue with the Phase I ESA for the subject property, the Phase I ESA will be conducted and completed. However, if this information is already available and if DHHL is able to acquire this information, an additional Phase I ESA may not need to be necessary at this time.

VERY TRULY YOURS,

(Dricka Brown for) George Atta

CC: P:\2008\28054-01 DHHL East Makaala\Phase I\DHHL Memo_Phase I_091808.doc

UNLESS WRITTEN OBJECTION IS RECEIVED WITHIN SEVEN DAYS, WE ASSUME STATEMENTS CONTAINED WITHIN ARE ACCEPTED