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STATE OF HAWAII

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EXECUTIVE ASSISTANT

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879

HONOLULU, HAWAII 96805

January 26, 2005

Ms. Genevieve Salmonson, Director
Office of Environmental Quality Control
235 South Beretania Street, Room 702
Honolulu, Hawaii 96813

Dear Ms. Salmonson:

SUBJECT: Final Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

The Department of Hawaiian Home Lands has reviewed the comments received during the 30-day public comment period which began on August 8, 2004. We have determined that this project will not have significant environmental effects and have issued a Finding of No Significant Impact. Please publish this notice in the February 8, 2005, OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, summary of the proposed action, and four copies of the Final Environmental Assessment.

Should you have any questions regarding this matter please contact Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

Enc.

2005-02-08 FONSI
HAWAIIAN HOMESTEAD LAND SUBDIVISION
AT WAIOHULI

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Final
Environmental Assessment

PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI

Prepared for the Approving Agency:

State of Hawaii, Department of Hawaiian Home Lands

January 2005

MUNEKIYO & HIRAGA, INC.

Final
Environmental Assessment

PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI

Prepared for the
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of Hawaiian Home Lands

January 2005

MUNEKIYO & HIRAGA, INC.

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Preface

The State of Hawaii, Department of Hawaiian Home Lands, proposes to create three (3) residential subdivisions on Hawaiian homestead lands identified by TMK 2-2-02: por. 56 at Waiohuli in Kula, Maui, Hawaii.

Since the proposed action involves the use of State lands and funds, an Environmental Assessment (EA) has been prepared as required by Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200 of the Hawaii Administrative Rules for the State Department of Health, in order to document the proposed action's technical characteristics, environmental impacts, and alternatives, as well as advance findings and conclusions relative to the significance of the proposed action.

Executive Summary

Project Name:	*Hawaiian Homestead Land Subdivisions At Waiohuli*
Type of Document:	Final Environmental Assessment
Legal Authority:	Chapter 343, Hawaii Revised Statutes
Agency Determination:	FONSI
Applicable Environmental Assessment review "trigger":	Use of State Lands and Funds
Location:	Maui Island Waiohuli, Kula TMK: 2-2-02:56 (por.)
Applicant:	State of Hawaii Department of Hawaiian Home Lands 1099 Alakea Street, Suite 2000 Honolulu, Hawaii 96813
Approving Agency:	State of Hawaii Department of Hawaiian Home Lands P.O. Box 1879 Honolulu, Hawaii 96805 Contact: Micah Kane, Chairman Phone: (808)586-3801
Consultant:	Munekiyo & Hiraga, Inc. 305 High Street Wailuku, Hawaii 96793 Contact: Michael T. Munekiyo Phone: (808) 244-2015
Project Summary:	The applicant is proposing to create three (3) residential subdivisions on approximately 121.7 acres of Hawaiian homestead lands. A total of 99 house lots ranging from 0.5 to 1 acre in size will be created in the three (3) subdivisions. The proposed action also includes grubbing and grading for the construction and installation of roadways, utilities and drainage systems.

Chapter I

Project Overview

I. PROJECT OVERVIEW

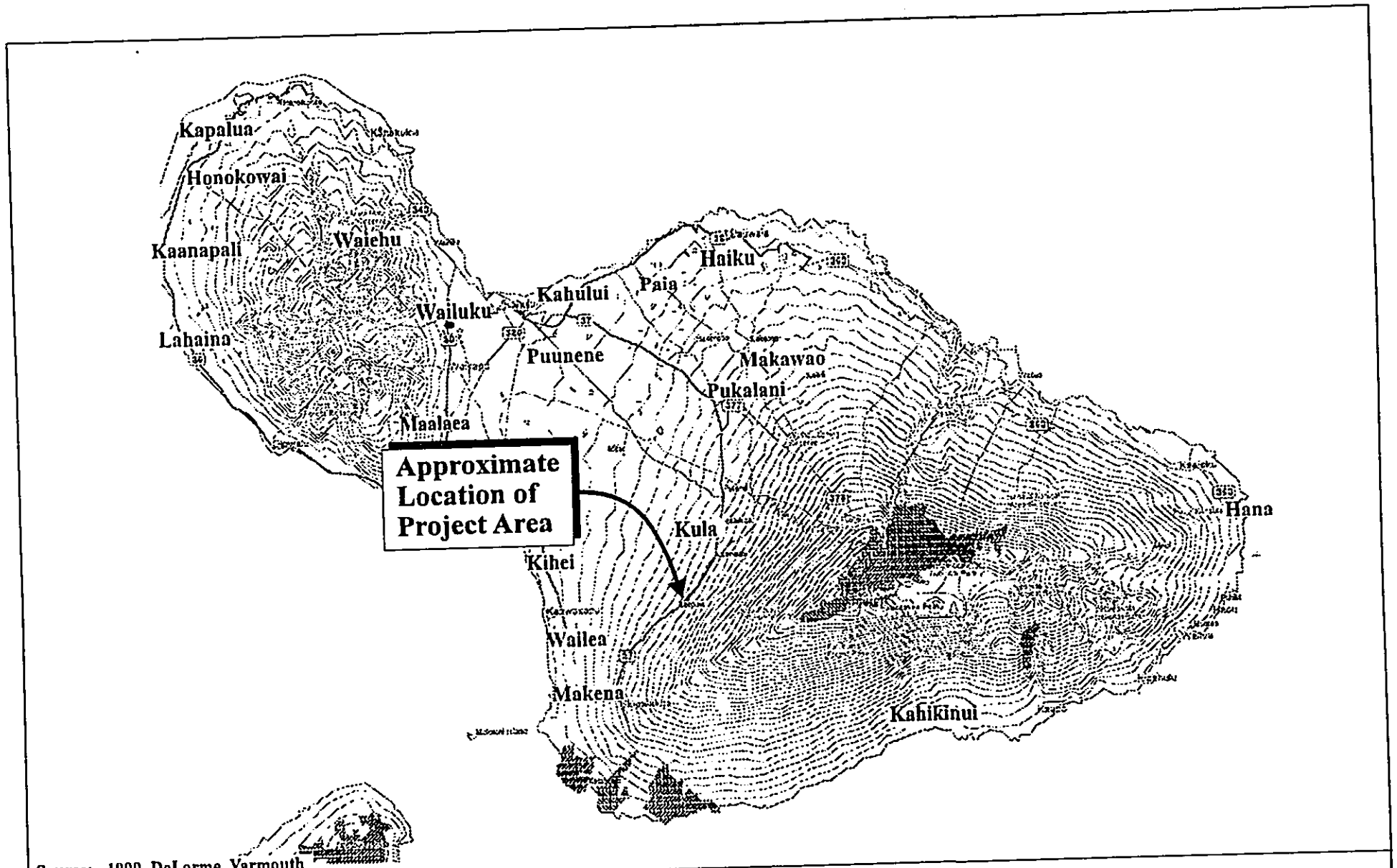
A. PROJECT LOCATION, EXISTING USE, AND LAND OWNERSHIP

The State Department of Hawaiian Home Lands (DHHL) proposes to create three (3) residential subdivisions on Hawaiian homestead lands at Waiohuli in Kula, Maui, Hawaii. See Figure 1. The proposed action addresses the need for improved houselots for residential construction and occupancy by Hawaiian homestead land lessees.

Identified by TMK 2-2-02: por. 56, the project sites are contiguous to DHHL's Kula Residential Lot, Unit 1 Subdivision (Kula Residential Subdivision), which encompasses a land area of approximately 690 acres. Situated on the southwestern flank of Haleakala, the project sites are located to the west of Kula Highway and are surrounded by lands that are rural in character. The town of Pukalani is located about 8.0 miles to the north of the sites, while the community of Kihei, although not directly accessible, is situated approximately 5.0 miles to the west.

The project sites are currently undeveloped and are vegetated with kikuyu grass and black wattle trees at the upper elevations, and kiawe, lantana, and prickly pear cactus (panini) at the lower elevations. Access to the project sites are presently provided by Kula Highway and several roadways in the Kula Residential Subdivision.

The lands underlying the project sites lie within the State Agricultural district and are designated for agricultural uses by the Makawao-Pukalani-Kula Community Plan and Maui County zoning. The DHHL is the fee simple owner of the lands underlying the project sites.



Source: 1999 DeLorme Yarmouth

Figure 1

Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
Regional Location Map

NOT TO SCALE

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Prepared for: State of Hawaii, Dept. Of Hawaiian Home Lands

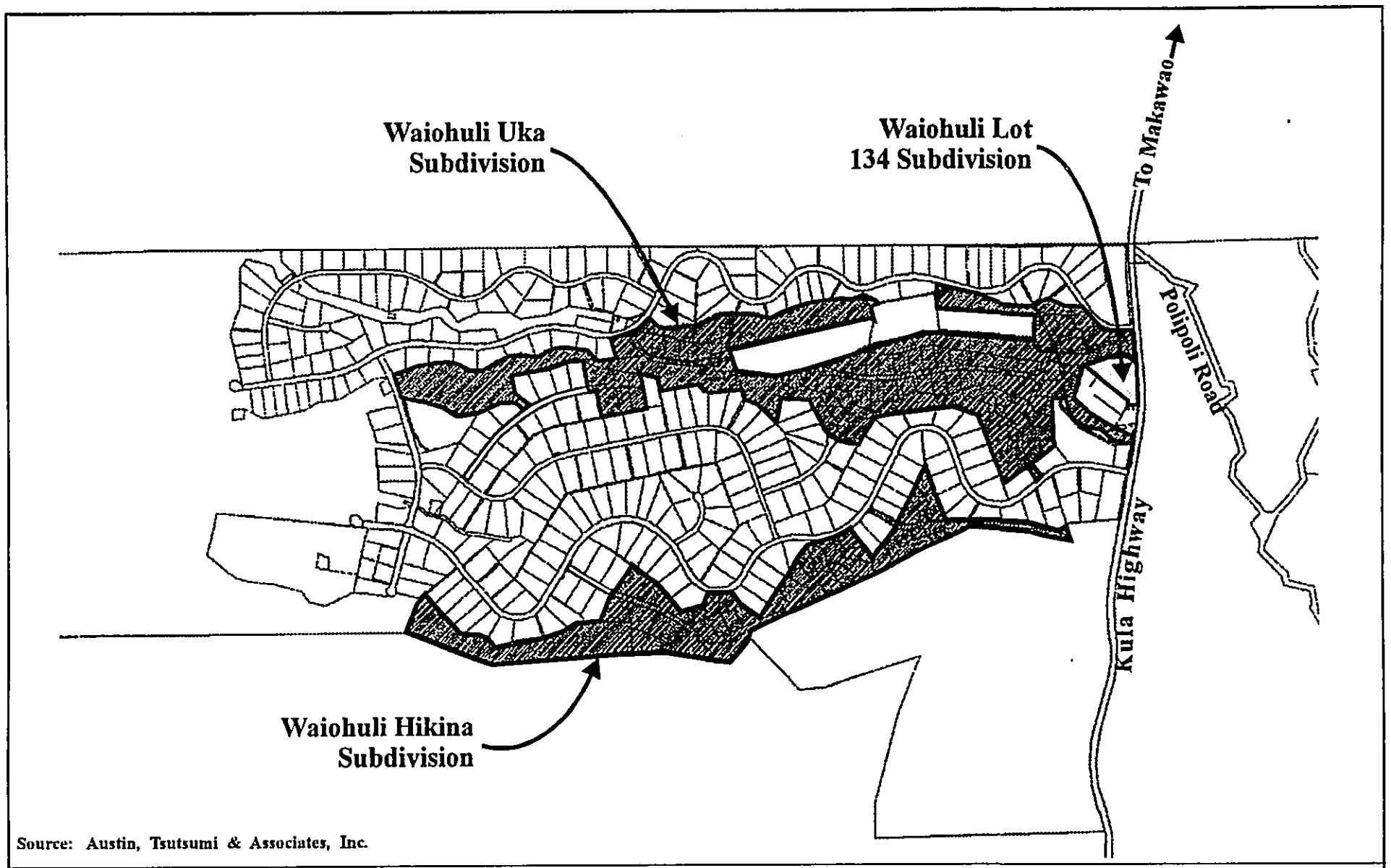
B. ***PROPOSED ACTION***

As previously noted, the proposed action addresses the need for improved residential houselots for Hawaiian homestead land lessees. As of January 31, 2004, there were a total of 6,679 individuals on the waiting list for Hawaiian homestead lands on the island of Maui.

Toward addressing this need, the proposed action will involve the subdivision and the consolidation/re-subdivision of twelve (12) existing lots in the Kula Residential Subdivision to create three (3) residential subdivisions: the Waiohuli Lot 134 Subdivision, the Waiohuli Hikina Subdivision, and the Waiohuli Uka Subdivision. See Figure 2 and Appendix "A", Preliminary Subdivision Plans.

Since the completion of the early consultation process for the project's Environmental Assessment (EA), the project's original plans for two (2) of the proposed subdivisions were modified based on a re-evaluation of the project's operational requirements. The project's original plans for the Waiohuli Hikina subdivision proposed 43 houselots, while the plans for the Waiohuli Uka Subdivision called for 65 houselots. The original plans for the Waiohuli Hikina Subdivision were revised to improve drainage conditions, while the plans for the Waiohuli Uka Subdivision were modified to improve access to houselots, as well as improve drainage.

The Waiohuli Lot 134 Subdivision (2.47 acres) will involve the subdivision of existing Lot 134 to provide four (4) houselots. The Waiohuli Hikina Subdivision (37.3 acres) will provide 36 houselots and involve the consolidation and re-subdivision of four (4) existing lots. The Waiohuli Uka Subdivision (81.92 acres) will provide 59 houselots and involve the consolidation and re-subdivision of seven (7) existing lots. A total of 99 houselots will be created with individual lots ranging in size from



Source: Austin, Tsutsumi & Associates, Inc.

Figure 2

Proposed Hawaiian Homestead Land Subdivisions at Waiohuli

Project Location Map

NOT TO SCALE

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approximately 0.5 to 1.0 acre. Easements and additional lots for roadway, drainage, and utilities purposes will also be created by the proposed action.

The proposed action also includes grubbing and grading for the construction and installation of roadways, utilities and drainage systems. The construction of residential housing and the installation of individual wastewater systems (IWS) will be the responsibility of separate homestead land lessees.

It is noted that existing utilities serving the Kula Residential Subdivision include drainage, water, overhead electrical systems, and an underground telecommunication system that were installed independently of the project by Sandwich Isles Communications. Individual wastewater systems (IWS) were installed by the separate lessees for sewer purposes.

Generally, the existing utilities have been installed within the roadway right-of-ways. Drainage and water easements in favor of Maui County and overhead utility easements in favor of Maui Electric Company (MECO) have been designated for portions of the facilities that are outside of the roadway right-of-ways. Drainage culverts with inlet and outlet structures were installed under sections of the roadway to accommodate drainage throughout the subdivision.

In addition, the majority of the roadway infrastructure was constructed during the development of the Kula Residential Subdivision. The existing roadways consist of 50- and 40-foot right-of-ways with 24- and 22-foot wide travelways, respectively, as well as paved swales.

The estimated cost of the proposed action is approximately $7.0 million. Construction is anticipated to commence upon the receipt of all applicable permits and is expected to take about 12 months.

C. ***REGULATORY CONTEXT***

Since the proposed action involves the use of State lands and funds, this Environmental Assessment (EA) has been prepared pursuant to Chapter 343, Hawaii Revised Statutes and Title 11, Chapter 200 of the Hawaii Administrative Rules for the State Department of Health.

The proposed action will be implemented under the provisions of the Hawaiian Homes Commission Act of 1920, as amended (the Act). The Act authorizes the DHHL, which was created and charged with the responsibility of administering the Act, to lease to native Hawaiians the right to the use and occupancy of Hawaiian home lands for agricultural, pastoral, and residential purposes, and to grant licenses to public utilities and others for various purposes. As provided for by the Act, Hawaiian home lands used and disposed of under the provisions of the Act are exempt from State and County land use planning and zoning regulations, including those for subdivisions. Homestead land lessees, however, are subject to County building code requirements.

With regard to the proposed action, and as allowed by the Act, the DHHL has declared exemptions from various regulations pertaining to the development of subdivisions. See Appendix "B". In addition to land use exemptions, the DHHL has declared exemptions from subdivision tax clearance, time extension, and filing fee requirements, as well as subdivision design requirements regarding cul-de-sac lengths, street tree plantings, the placement of flag lots, and the installation of underground utilities. The DHHL has also declared an exemption to allow for a

minimum lot area of 0.5 acre as permitted by rural district zoning standards.

These exemptions will not substantially endanger human health or safety and are in the public's interest. Compliance with those sections of the Maui County Code for which these exemptions are being invoked would produce serious hardship without equal or greater benefit to the homestead land lessees or the public.

Chapter II

Description of the Existing Environment

II. DESCRIPTION OF THE EXISTING ENVIRONMENT

A. PHYSICAL SETTING

1. Surrounding Land Uses

The Kula region is located on the western slopes of Haleakala, with the population focused on two (2) principal settlement areas. The towns of Makawao and Pukalani reflect a mixture of suburban and rural land uses, while the Kula area is characterized by a combination of rural and agricultural uses. Kula is renown for its produce and flowers which are exported to domestic, mainland, and international markets.

The Makawao-Pukalani-Kula region is popularly referred to as Upcountry, reflecting first its location and elevation on Haleakala and secondly, the social qualities of its small rural, agricultural towns and villages.

Land uses in the vicinity of the project sites are reflected by low-density rural residential properties, small farms, and lands engaged in agricultural cultivation and ranching activities.

2. Climate

Kula's climate is typical of most mountainous areas in Hawaii, with climatic conditions varying according to altitude and wind direction. Lowland areas are generally typified by arid to semi-tropical climates, while higher elevations are characterized by more temperate conditions.

The Kula region is relatively dry with rainfall measuring from 20 to 30 inches annually. Generally, temperatures range from the low 50's during the winter, to the mid-80's during the summer. Maui is

cooled by the northeast tradewinds throughout most of the year. These winds are constant during the spring and summer months. Kona weather conditions, ranging from strong southerly winds with heavy rains, to calm, humid, or rainy weather, are in evidence during the winter months.

3. ***Topography and Soil Characteristics***

Located on the southwestern flank of Haleakala, the project sites slope away from Kula Highway in a northwesterly direction at an average grade of 10 to 15 percent. Elevations at the Waiohuli Lot 134 Subdivision range from 2,970 to 2,920 feet above mean sea level (amsl), while elevations at the Waiohuli Hikina and Waiohuli Uka Subdivisions range from 2,920 to 2,450 feet amsl and 2,970 to 2,150 amsl, respectively. As the lands ascend, the terrain becomes steeper and gulches and intermittent drainageways caused by erosion are evidenced.

Underlying the site and surrounding lands are soils belonging to the Puu Pa-Kula-Pane and Kamaole-Oanapuka associations. See Figure 3. The Puu Pa-Kula-Pane soil association is found on the intermediate and high uplands, and consists of deep, gently sloping to steep, well-drained soils that have a medium or moderately textured subsoil. This association is used for orchards, pastures, truck crops, and wildlife habitat. The Kamaole-Oanapuka association is found on the low and intermediate highlands, and is characterized by gently sloping to moderately steep, well-drained, very stony to extremely stony soils that have a fine or medium-textured subsoil. This association is utilized for pasture and wildlife.

LEGEND

① Pulehu-Ewa-Jaucas association

② Waiakoa-Keahua-Molokai association

③ Honolua-Olelo association

④ Rock land-Rough mountainous land association

⑤ Puu Pa-Kula-Pane association

⑥ Hydrandepts-Tropaquods association

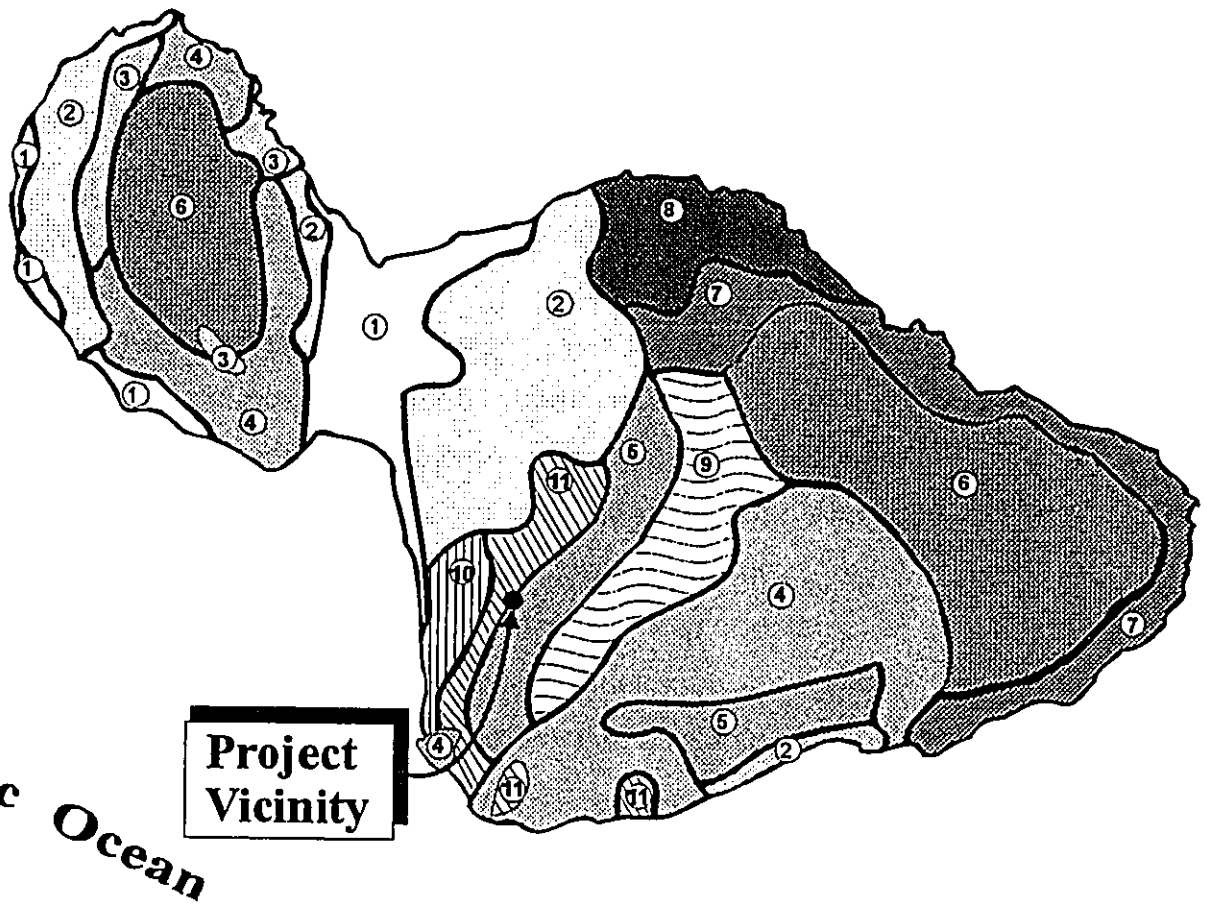
⑦ Hana-Makaalae-Kailua association

⑧ Pauwela-Haiku association

⑨ Laumaia-Kaipoipoi-Olinda association

⑩ Keawakapu-Makena association

⑪ Kamaole-Oanapuka association



Map Source: USDA Soil Conservation Service

Figure 3 Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
Soil Association Map

NOT TO SCALE

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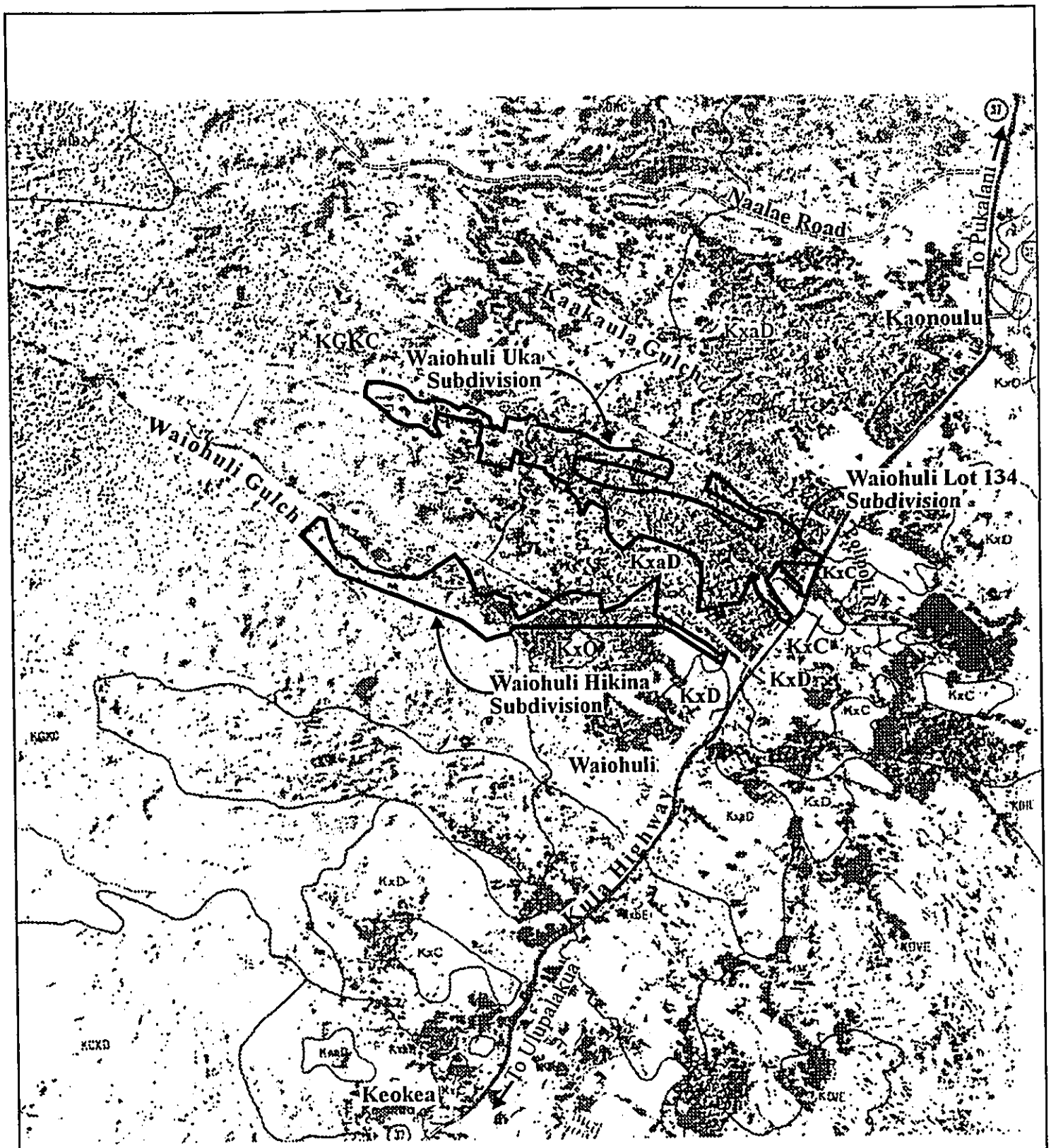
The soil types specific to the site are the Kula cobbly loam, 12 to 20 percent slopes (KxaD), and Kamaole very stony silt loam, 3 to 15 percent slopes (KGKC). See Figure 4. Kula cobbly loam and Kamaole very stony silt loam soils are well-drained soils developed in volcanic ash. For Kula cobbly loam soils, permeability is moderately rapid, runoff is medium, and erosion hazard is moderate. For Kamaole very stony silt loam, permeability is moderate, runoff is slow to medium, and the erosion hazard is slight to moderate.

Lands underlying the project sites are designated "C" and "E" by the University of Hawaii Land Study Bureau. According to the classification system, land productivity characteristics are rated on a scale from "A" through "E", with the designations "A" and "E" representing the highest and lowest ratings, respectively.

The State Department of Agriculture has established three (3) categories of Agricultural Lands of Importance to the State of Hawaii (ALISH). "Prime" agricultural lands have the soil quality, growing season, and moisture supply needed to produce sustained high crop yields economically when treated and managed according to modern farming methods. "Unique" agricultural lands possess a combination of soil quality, location, growing season, and moisture supply currently used to produce sustained high yields of a specific crop when treated and managed according to modern farming methods. "Other" agricultural lands include those which have not been rated "prime" or "unique".

As indicated by the ALISH map, the lands in the project area fall within the "Other" agricultural lands category. See Figure 5.



Source: USDA, Soil Conservation Service

Figure 4 Proposed Hawaiian Homestead Land Subdivisions at Waiohuli

Soil Classification Map

0 1000 Feet
500 2000

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Prepared for: State of Hawaii, Dept. of Hawaiian Home Lands

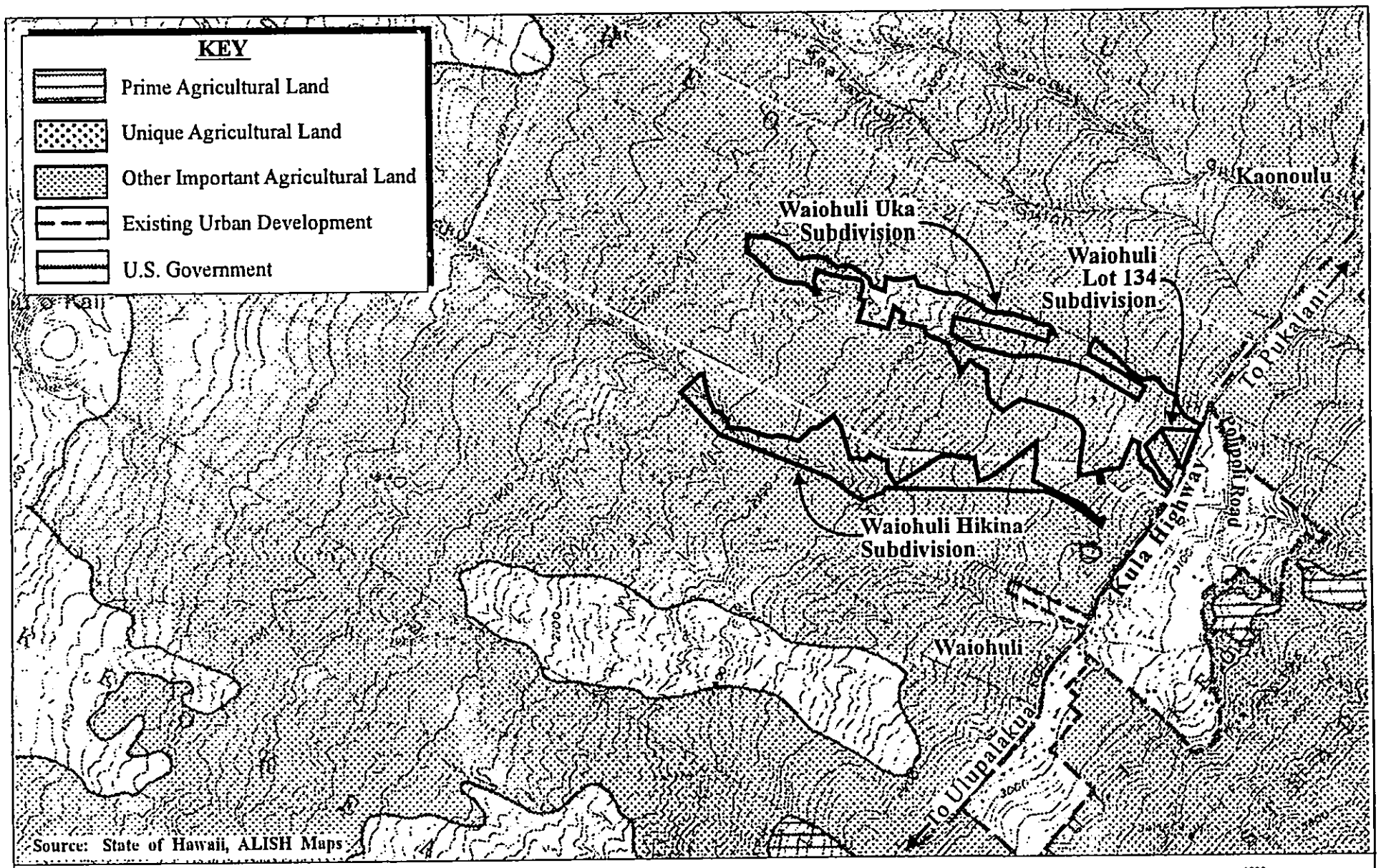


Figure 5

Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
ALISH Map

Prepared for: State of Hawaii, Dept. of Hawaiian Home Lands

4. ***Flood Hazard***

As indicated by the Federal Emergency Management Agency's flood insurance rate maps for the area, the project sites are situated in Zone C, an area of minimal flooding.

5. ***Flora***

A botanical survey of DHHL's Waiohuli parcel (TMK 2-2-02:56), including the project sites, was conducted by Char & Associates in September 1994 for the Kula Residential Subdivision. The primary objectives of the survey were to identify and inventory major vegetation types, search for rare, threatened, and endangered plant species, and identify potential environmental impacts and propose appropriate mitigation measures.

Three (3) major vegetation types were identified during the survey. Ranging from the Kula Highway to an elevation of approximately 2,350 feet, a dense forest of black wattle trees characterizes the vegetation type occurring on the upper section of the Waiohuli parcel. Extending from the 2,350 foot elevation downslope to the parcel's boundary and beyond, dense patches of lantana and clumps of prickly pear cactus (a.k.a., panini) characterize the second vegetation type. Gulch vegetation comprises the third vegetation type and typically consists of dense clumps of Guinea grass with scattered stands of Chinaberry trees.

The vegetation within the Waiohuli parcel is dominated primarily by introduced or alien species. Of a total of 112 plant species inventoried, 95 are introduced or alien species, two (2) are originally of Polynesian introduction, and fifteen (15) are native. Of the native species, twelve (12) are indigenous, that is native to the

Hawaiian Islands and elsewhere, and three (3) are endemic, that is native only to the Hawaiian Islands.

6. ***Fauna***

A survey of avifauna and feral mammals on DHHL's Waiohuli parcel, including the project sites, was conducted by Environmental Consultant Faunal Surveys in November 1994 for the Kula Residential Subdivision. The objectives of the survey were to document bird and mammal species, provide data on the abundance of each species, note the presence or likely occurrence of any native fauna, particularly those listed as threatened or endangered, and determine any significant impacts to the native fauna in the region.

The only endemic native landbird recorded during the survey was the Common Amakihi, the most abundant and widespread of the native landbirds. Although the Short-eared Owl (a.k.a., Pueo) occurs in the Kula and the Upcountry region, none were recorded during the survey. The Pacific Golden-Plover was the only indigenous native migratory species observed during the survey and is the most abundant of the shorebird species which winters in Hawaii. The only other migrant species which may occur in this region is the Ruddy Turnstone. No indigenous native seabirds or waterbirds were recorded, or would be expected on the Waiohuli parcel. During the survey, a total of fourteen (14) exotic birds, that is, introduced to the Hawaiian Islands, were recorded.

Mammals recorded during the survey include cats, Axis Deer and the Small Indian Mongoose. During the survey, a Hawaiian Hoary Bat was once observed foraging above the pasture lands near the

Kula Highway at the northeast edge of the Waiohuli parcel. This species is known to roost solitarily in trees and forages for flying insects using echolocation. In addition, these bats have been reported from a variety of habitats including ranch and agricultural lands, native forest and alpine environs, ponds and bays, second growth forest, and urban areas. Since the occurrence and abundance of the Hawaiian Hoary Bat on Maui has not been extensively studied, little is known about the life history of this endemic and endangered species.

7. ***Archaeological Resources***

An archaeological inventory survey of the DHHL's Waiohuli parcel (including the project sites) and its Keokea parcel (TMK 2-2-02:55), was conducted by Paul H. Rosendahl, Inc. in 1989 for the development of the Kula Residential Subdivision. The inventory survey encompassed 674 acres in Waiohuli and 351 acres in Keokea, and included aerial reconnaissance, as well as variable-intensity pedestrian surveys. Of the 159 sites identified during the survey, 51 sites were located in Waiohuli.

In its July 24, 1995 letter commenting on the Kula Residential Subdivision, the State Historic Preservation Division (SHPD) indicated that the Kula Residential Subdivision would have no adverse effect on significant historic sites with the implementation of its recommendations regarding data recovery and site preservation. See Appendix "C". In 1998, archaeological data recovery for the Kula Residential Subdivision was conducted by Scientific Consultant Services, Inc. (SCS) by following a focused research design devised by the SHPD. The data recovery involved ten (10) of the previously identified fifty-one (51) sites, as well as

one (1) newly identified site. The data recovery report prepared by SCS was approved by the SHPD on March 23, 2000. See Appendix "C-1". In January 2001, SCS prepared a preservation plan for the interim and long-term preservation of four (4) previously identified ceremonial/permanent habitation sites on the Waiohuli parcel. On February 4, 2002, the SHPD approved the preservation plan prepared by SCS. See Appendix "C-2".

In January 2001, SCS prepared a burial treatment plan for three (3) burial locations that were identified during previous archaeology of DHHL's Waiohuli parcel. In addition to the DHHL, representatives of the Maui/Lanai Islands Burial Council, and the SHPD, the Waiohuli Homesteaders Association, and Hui Malama were consulted during the preparation of the plan. In correspondence dated April 29, 2003, the SHPD approved the burial treatment plan prepared by SCS. See Appendix "C-3".

8. ***Air Quality***

There are no point sources of airborne emissions in the immediate vicinity of the project sites. The air quality in the Kula region is considered good, with existing airborne pollutants attributed primarily to vehicle-generated exhaust from the region's roadways. Other sources of airborne pollutants typically include dust and equipment emissions resulting from agricultural activities and smoke from sugar cane harvesting operations occurring in the Central Maui plain. These sources are considered intermittent and the generated particulates are quickly dispersed by the prevailing tradewinds.

9. *Noise Characteristics*

Noise levels in the Kula region are characteristic of its rural surroundings and are considered relatively low. Ambient noise levels in the vicinity of project sites are attributed to natural (e.g. wind) conditions, traffic along the Kula Highway, and agricultural activities involving the intermittent operation of equipment, such as tractors, sprayers, and trucks.

10. *Scenic and Open Space Resources*

Situated on the slopes of Haleakala, Kula provides expansive scenic views of the Central Maui isthmus, off-shore islands, and the West Maui Mountains. From clearings throughout the project sites, Maui's central isthmus and the northern and southern shorelines of Maui can be seen makai (northwest and southwest, respectively) of the project area. Mauka of the site, Haleakala is clearly visible, while makai of the site, the West Maui Mountains are visible. Further off in the distance, to the southwest, are the islands of Lanai and Kaho'olawe.

B. *SOCIO-ECONOMIC ENVIRONMENT*

1. *Community Character*

From a regional standpoint, the project sites are part of the Makawao-Pukalani-Kula Community Plan region. The region includes a diverse range of physical and socio-economic environments. With its temperate climate, fertile soil, and sweeping views, Kula has grown steadily over the past few years. The project sites are situated along the southwestern flank of Haleakala in an area which is generally characterized by low-density rural residential properties, small farms, and lands engaged in agricultural cultivation and ranching activities.

2. ***Population***

The population of Maui County has exhibited relatively strong growth over the past decade with the 2000 population of 128,241 reflecting a 27.6 percent increase over the 1990 population of 100,504. Growth in the County is expected to continue, with resident population projections to the years 2010 and 2020, estimated to be 151,269 and 175,136, respectively (SMS, June 2000).

The 2000 population of the Makawao-Pukalani-Kula region was 21,571. A projection of the region's population shows an increase to 25,237 by the year 2010 and 28,974 by the year 2020 (SMS, June 2000).

3. ***Economy***

Agriculture and tourism are vital components of Maui's economy. The cultivation of pineapple and sugar cane and the visitor industry provide for much of the island's economic stability.

The economy of Kula is heavily dependent upon agriculture. Its rich soil has made the region renown for the quality of its produce and flowers which are exported to domestic, mainland, and international markets. Cattle ranching and alternative ranching activities, such as sheep and llama herding, are also an important element of Kula's economy.

C. *PUBLIC SERVICES*

1. *Police and Fire Protection*

The Maui Police Department (MPD) is responsible for the preservation of the public peace, prevention of crime, and

protection of life and property. MPD's Uniformed Services Bureau includes the uniformed patrol services in the following patrol districts: Wailuku, Lahaina, Hana, Molokai, and Lanai. The Wailuku station, which services the Haiku, Paia, and Makawao-Pukalani-Kula regions, is situated to the northwest, approximately 19.0 miles from the project sites. A MPD substation is located in Makawao about 8.0 miles to the north of the project sites, while a new police community service center will be located in the Kulamalu Town Center approximately 7.0 miles to the north.

Fire prevention, protection, and suppression services are provided by the Maui Fire Department's (MFD) Kula fire station. Situated approximately 3.0 miles north of the project sites, the Kula facility contains a 750 gallon pumper with a delivery rate of 1,500 gallons per minute (GPM). The Makawao and Paia fire stations provide additional firefighting support for the Kula region, and are situated approximately 8.0 and 14.0 miles to the north of the project sites, respectively.

2. ***Medical Facilities***

Maui Memorial Medical Center, the only major medical facility on the island, is approximately 19.0 miles to the northeast of the project sites. Licensed for 196 beds, this facility provides acute, emergency, general, and obstetric care services. Several medical and dental care facilities are located in Makawao and Pukalani to serve Upcountry residents.

Licensed for 98 beds, Kula General Hospital is situated about 2.0 miles to the southwest of the project sites. An out-patient clinic for

the area's residents operates from 8:00 a.m. to 4:30 p.m. on weekdays.

3. ***Solid Waste***

Residential solid waste collection and disposal is provided on a weekly basis by the County's Department of Public Works and Environmental Management's (DPWEM) Solid Waste Division.

Solid waste generated in the Upcountry region is transported to the Central Maui Landfill off Pulehu Road, approximately 9.0 miles northwest of the project sites. Other than the Hana Landfill, the Central Maui Landfill is the only disposal site on the island of Maui which accepts County-hauled residential waste, commercially-hauled commercial waste, and self-hauled waste.

4. ***Schools***

The State Department of Education (DOE) operates five (5) public schools in Upcountry Maui. They are Makawao Elementary School, Pukalani Elementary School, Kula Elementary School, Kalama Intermediate School, and King Kekaulike High School. The 2003 student enrollments of these schools are as follows: Makawao Elementary School (509), Pukalani Elementary School (409), Kula Elementary School (423), Kalama Intermediate School (1,150), and King Kekaulike High School (1,396).

Makawao, Pukalani, and Kula Elementary Schools provide educational services for students from Kindergarten to Grade 5, while Kalama Intermediate School in Makawao, provides instruction for students from Grades 6 to 8. Students in Grades 9 to 12 attend

King Kekaulike High School near Pukalani, approximately 8.0 miles to the north of the project sites.

The region is also served by privately operated facilities, such as St. Joseph School (Grades K to 6), Haleakala School (Grades K to 8), Seabury Hall (Grades 6 to 12), and the Maui Campus of Kamehameha Schools (Grades K to 9).

5. ***Recreational Facilities***

County recreational facilities in the Upcountry region include five (5) neighborhood parks and three (3) district parks comprising 74.6 acres.

Neighborhood parks and facilities include Haliimaile Park, Kula Community Center, Waiakoa Gym, Harold Rice Memorial Park, and Keokea Ball Park. The district parks include the Eddie Tam Memorial Center, Pukalani Park and Community Center, and the recently completed Kula Recreational Center.

Situated along the higher elevations of Haleakala, Polipoli State Park, and Haleakala National Park provide camping, hiking, and sight-seeing opportunities for residents and visitors alike.

Recreational facilities within the region include four (4) tennis courts, nine (9) sports fields, three (3) sports courts, five (5) community centers, and three (3) gyms.

D. INFRASTRUCTURE

1. Roadways

The existing roadway system in the vicinity of the project includes the following roadways and intersections.

a. Roadways

Haleakala Highway is a two-lane State Highway that is generally oriented in a northwest-southeast direction. This roadway begins in Kahului in the vicinity of the Triangle Square Commercial project. The highway intersects Old Haleakala Highway and Kula Highway at the Five Trees Junction and terminates at Haleakala National Park. Haleakala Highway is a three-lane facility from Hana Highway to Makawao Avenue with two (2) lanes in the eastbound (mauka) direction and a single lane in the westbound (makai) direction. Haleakala Highway has a posted speed limit of 45 miles per hour (mph) on the section between Makawao Avenue and Kula Highway. East of the Five Trees Junction, Haleakala Highway has a posted speed limit sign of 30 mph. The State is in the process of widening Haleakala Highway from two (2) to four (4) lanes between Hana Highway and its intersection with the Old Haleakala Highway (western junction). A grassed median will be provided to separate the mauka and makai-bound travel lanes and the existing traffic signal system at the highway and fire break road junction will be relocated. In addition, a new traffic signal system will be installed at the highway's intersection with Haliimaile Road. The completion of this widening project is anticipated to occur in the 2005 timeframe.

Kula Highway is a two-lane, rural, arterial, State highway that connects the Pukalani area with the Ulupalakua area. Kula Highway is generally oriented in the north-south direction and begins in Pukalani at the Five Trees Junction of Old Haleakala Highway and Haleakala Highway. In the vicinity of the project site, Kula Highway has a posted speed limit of 30 mph.

Old Haleakala Highway is a two-lane, County collector road that serves the Pukalani area. Old Haleakala Highway is generally oriented in a northwest-southeast direction and provides a parallel route to Haleakala Highway through the town of Pukalani. Old Haleakala Highway begins at its intersection with Haleakala Highway approximately 0.5 mile east of Haliimaile Road and terminates at the Five Trees Junction at Haleakala Highway and Kula Highway. Old Haleakala Highway has a posted speed limit of 35 mph.

Makani Road is a two-lane, County collector road that serves Pukalani town and Makawao town. Makani Road is generally oriented in the north-south direction, originating within Pukalani at its intersection with Old Haleakala Highway, and extending northeasterly to eventually intersect with Makawao Avenue.

Pukalani Street is a two-lane, County collector roadway serving residential and commercial areas in Pukalani town. Pukalani Street is generally oriented in the north-south direction, originating at its intersection with Old Haleakala

Highway, and extending southwesterly to the Pukalani County Club Golf Course.

Within the study area, ***Makawao Avenue*** is a two-lane, County collector road that serves Pukalani town and Makawao town. Makawao Avenue is generally oriented in the north-south direction, originating at Pukalani from its intersection with Old Haleakala Highway and terminating across from Kaupakulua Road north of its intersection with Baldwin Avenue.

Loha Street is a two-lane, County collector roadway serving residential areas in Pukalani. Loha Street is a continuation of Makawao Avenue south of its intersection with Old Haleakala Highway.

A'Apueo Parkway is a two-lane, east-west, private collector roadway with a posted speed limit of 20 mph. A'Apueo Parkway serves as the only access to the Maui Campus of Kamehameha Schools and the Kulamalu project area.

Omaopio Road is a two-lane, east-west, County collector roadway primarily serving residential and agricultural uses on the west side of Kula Highway. On the east side of Kula Highway, Omaopio Road intersects with Lower Kula Road, which is a two-lane, County collector road. Lower Kula Road is generally oriented in the north-south direction and runs parallel to Kula Highway.

Kekaulike Avenue is a two-lane, east-west, State collector roadway primarily serving residential and agricultural uses on the west side of Kula Highway. Kekaulike Avenue eventually becomes Haleakala Highway, which runs parallel to Kula Highway.

Pueo Drive is a two-lane, east-west, County collector roadway that originates at its intersection with Kula Highway and extends to the west through the DHHL's Kula Residential Subdivision. Pueo Drive is one (1) of two (2) main roadways that are used to service the Kula Residential Subdivision.

Lauie Drive is a two-lane, east-west, County collector roadway that originates at its intersection with Kula Highway and extends to the west through the DHHL's Kula Residential Subdivision. Lauie Drive is the other main roadway that is used to service the Kula Residential Subdivision.

b. Intersections

Haleakala Highway/Old Haleakala Highway (western junction) A contraflow operation on Haleakala Highway is implemented during the weekday AM peak period of traffic. When the contraflow operation is in effect, all traffic on the Haleakala Highway eastbound approach is forced to exit via right turn onto Old Haleakala Highway and right-turns from the Old Haleakala Highway approach onto Haleakala Highway are prohibited. As a result of the AM contraflow operation, there is no conflicting traffic for the northbound to

westbound left-turn movement from the Old Haleakala Highway approach.

Haleakala Highway/Makani Road is a "cross" intersection with traffic on Makani Road controlled by a stop sign.

Haleakala Highway/Makawao Avenue is a signalized "cross" intersection.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction) is a signalized "cross" intersection. Haleakala Highway is the southbound and westbound approaches of the intersection (Haleakala Highway makes a 90 degree turn at this intersection). Kula Highway is the northbound approach and Old Haleakala Highway is the eastbound approach at this intersection.

Old Haleakala Highway/Pukalani Street is a signalized "tee" intersection with Pukalani Street as the stem.

Old Haleakala Highway/Makawao Avenue/Loha Street is a signalized "cross" intersection.

Kula Highway/King Kekaulike High School (KKHS) Driveway/Residential Driveway is an unsignalized "cross" intersection.

Kula Highway/A'apueo Parkway is an unsignalized "tee"-intersection with A'apueo Parkway as the stop sign-controlled stem.

Kula Highway/Omaopio Road is an unsignalized "cross" intersection.

Kula Highway/Kekaulike Avenue is an unsignalized "tee" intersection with Kekaulike Avenue as the stop sign-controlled stem.

Kula Highway/Pueo Drive is an unsignalized "tee" intersection with Pueo Drive as the stop sign-controlled stem.

Kula Highway/Lauie Drive is an unsignalized "tee" intersection with Lauie Drive as the stop sign-controlled stem.

2. *Water*

Although Makawao and Pukalani are gradually evolving into suburban communities, the Upcountry area remains rural and agricultural in nature. Dominant water uses in the region are attributed to agricultural activities.

Water service to the Makawao-Pukalani-Kula region is provided by the County Department of Water Supply (DWS). The region is supplied primarily by surface water sources, with distribution handled by the Makawao and Kula systems.

The Kula system consists of an upper and lower system, with the upper system located along the 4,000 foot elevation, and the lower system originating at the 3,000 foot elevation. The Lower Kula System serves the Omaopio, Olinda, and lower Kula communities,

while the Upper Kula System serves the remaining communities. The upper system collects water from Haipuaena, Puohakamoa, and Waiakamoi Streams, while the lower system diverts water from the Haipuaena, Puokakamoa, Waiakamoi, and Honomanu Streams.

The DWS operates a water treatment plant at Olinda with a capacity of 1.7 million gallons per day (MGD). Major storage reservoirs supporting the Upper Kula System include a 10 million gallon (MG) upper Waiakamoi dam/reservoir, a lower Waiakamoi concrete dam, two (2) 15 MG Waiakamoi concrete tanks, and a 3 MG Olinda steel tank. The recently constructed Kahakapao Reservoirs, consisting of two (2) 50 MG reservoirs in the vicinity of the Waiakamoi Reservoirs, also provide additional storage capacity for the upper system. During dry periods, the Kula system is supplemented by water pumped from the Makawao system.

On December 8, 1997, the DHHL and the DWS executed a Memorandum of Understanding (MOU) to cooperate with each other and construct water system improvements to provide potable water to DHHL's lands at Waiohuli and Keokea for residential development. For its part, the DHHL constructed a new 18-inch water transmission main from Naalae Road to Waiohuli, two (2) new booster pumps in the vicinity of the existing Kula Kai water tank, and three (3) new reservoirs, two (2) new pumps, and distribution lines in the Kula Residential Subdivision, while the DWS constructed a new in-line booster pump station and a new 2.0 MG water storage tank on the Lower Kula transmission main. Additionally, a Water Credits Agreement (WCA) was executed between DHHL and DWS on December 8, 1997. Under the terms of the WCA, the DWS will maintain the water system improvements

and provide the DHHL with up to 500,000 gallons of potable water per average day (except during any drought affecting the Lower Kula area as declared by the DWS).

The existing Kula Residential Subdivision water system is comprised of one (1) offsite Service Zone (Zone 1) and three (3) onsite Service Zones (Zones 2, 3, and 4). See Appendix "D". There are three (3) existing onsite reservoirs: two (2) 0.2 million gallon (MG) tanks and one (1) 0.5 MG tank. Water from the existing Lower Kula Water System flows into the 0.5 MG tank in Zone 3 via an 18-inch transmission line from Naalae Road. Water is either pumped up to the 0.2 MG Zone 2 tank or flows to the 0.2 MG Zone 4 tank. Service Zone 1 (elevation 3,095 to 2,915 feet) is connected to the Upper Kula Water System. Service Zone 2 (elevation 2,915 to 2,670 feet) includes a 0.2 MG reservoir with pipelines ranging in diameter from 6 to 12 inches. Service Zone 3 (elevation 2,670 to 2,270 feet) consists of a 0.5 MG reservoir with pipelines ranging in diameter from 6 to 12 inches. Service Zone 4 (elevation 2,270 to 2,000 feet) consists of a 0.2 MG reservoir tank with pipelines ranging in diameter from 6 to 12 inches.

3. ***Wastewater***

The Makawao-Pukalani-Kula region is not serviced by a County wastewater treatment system. A portion of Pukalani is serviced by a private wastewater treatment system, while the remainder of the Upcountry area is served by cesspools or septic tanks. The State Department of Health (DOH) has designated a critical wastewater disposal area throughout most of the island, including the Makawao-Pukalani-Kula region. Within the critical and non-critical areas, septic tanks are required for wastewater disposal. The

project sites are located within the non-critical wastewater disposal area.

A 5-year variance renewal was granted on July 18, 2002 by the DOH for the use of individual wastewater systems (IWS) within the existing Kula Residential Subdivision. Refer to Appendix "D". The original 5-year variance, which was granted on June 3, 1986, was for 386 houselots to utilize IWS within the Kula Residential Subdivision. However, since only 321 houselots were actually developed by the Kula Residential Subdivision, 65 houselots from the proposed project could be covered under the renewed variance. DOH also reviewed the Draft EA for the 99 lots included in the proposed action and determined that connection to the County system may not be reasonable at this time. DOH, therefore, will allow the construction and use of individual wastewater treatment systems which must comply with the wastewater rules in effect at the time the awardee (lessee) applies for a building permit. See Appendix "D-1".

4. ***Drainage***

The Upcountry region is situated along the upland slopes of Haleakala and ranges from 800 to 10,000 feet above mean sea level.

Most of the developed and agricultural areas are located between the 1,500 to 3,000 foot elevations. The Upcountry region is characterized by broad, rolling ridge tops; deep, precipitous gulches; and slope increases along ridges as terrain ascends in elevation. Due to the many gulches separating the region's arable

lands into smaller areas, the Upcountry area is considered better suited for smaller-scale agricultural operations.

Currently, offsite and onsite storm water runoff sheetflows in a northwesterly direction across the project sites. Onsite gullies and natural drainageways convey the runoff toward Kaakaulua Gulch to the north and Waiohuli Gulch to the south.

Downstream of the project sites, Kaakaulua Gulch and Waiohuli Gulch discharge runoff into Kulanihakoi Gulch and Waipuilani Gulch, respectively. Runoff from these gulches is ultimately discharged into the ocean.

The existing Kula Residential Subdivision onsite drainage system consists of paved swales, drain inlets, manholes, and drainage culverts along the roadways, lined interceptor ditches along property lines, and outlet structures along the gulches. Refer to Appendix "D".

The existing onsite drainage systems within the road right-of-ways are maintained by Maui County, including areas upstream and downstream of each road culvert crossing within the drainageways.

The existing drainage systems outside of the road right-of-ways, including lined interceptor ditches and outlet structures, are maintained by DHHL lessees and DHHL.

5. ***Electrical and Telephone Services***

Electrical and telephone services for the existing Kula Residential Subdivision were provided by Maui Electric Company, Ltd. and Sandwich Isle Communications, respectively.

Utility poles with overhead electrical lines, transformers, and streetlights were installed within roadways to provide electrical service to the Kula Residential Subdivision. Refer to Appendix "D".

In addition, underground handholes, pullboxes, conduits and wires were installed within roadways to provide telephone service to the subdivision.

Chapter III

Potential Impacts and Mitigation Measures

III. POTENTIAL IMPACTS AND MITIGATION MEASURES

A. IMPACTS TO THE PHYSICAL ENVIRONMENT

1. Surrounding Land Uses

The project sites are located in a rural, agricultural area characterized by low-density residential housing units and lands engaged in farming and ranching activities. Interspersed pockets of rural designated lands, characterized by single-family dwellings, lie along the mauka (eastern) side of Kula Highway in proximity of the project sites. Agricultural-zoned properties, consisting of farm, pastoral and undeveloped lands, adjoin the makai (western) side of the highway and also extend mauka of existing rural residential development.

With houselots ranging in size from approximately 0.5 to 1.0 acre, the proposed subdivisions will establish a low-density, rural residential neighborhood.

Although the proposed action will result in changes relating to land use density, the overall rural, residential character advanced by this action is not considered inconsistent with surrounding uses.

2. Topography and Landform

The proposed action will involve the clearing and grubbing of land that is presently undeveloped. Grading for the proposed subdivisions will involve excavation and embankment within the roadway right-of-way and within some of the adjoining lots. In general, finished contours will follow existing grades to minimize earthwork costs and maintain existing drainage patterns. Therefore, the proposed action is not expected to result in any adverse effects to the topography or landform.

3. ***Flora***

As previously indicated, the botanical survey of DHHL's Waiohuli parcel, including the project sites, identified three (3) major vegetation types. Ranging in elevation from approximately 3,000 to 2,350 feet, a dense forest of black wattle trees predominate the upper section of the project site. Dense patches of lantana and clumps of prickly pear cactus (a.k.a., panini) encompass an area extending from the black wattle forest to the Waiohuli parcel's boundary and beyond. Gulch vegetation, typified by dense clumps of guinea grass with scattered stands of Chinaberry trees, comprise the third vegetation type observed during the survey.

There are no known rare, threatened or endangered species of flora within the project sites. As such, the proposed action is not expected to have an adverse impact upon this component of the environment.

4. ***Fauna***

A survey of avifauna and feral mammals was undertaken to record birds and mammals within DHHL's Waiohuli parcel, including the project sites. As reflected by the survey, the only endemic native landbird recorded was the Common Amakihi, while the Pacific Golden-Plover was the only indigenous native migratory species observed. Although the Short-eared Owl (a.k.a., Pueo) occurs in the Kula and Upcountry region, none were located during the survey. None of the avifauna, with the exception of the Pueo, which is endangered on the island of Oahu, is listed as rare, threatened or endangered.

Mammals recorded during the survey include cats, Axis Deer, and the Small Indian Mongoose. A Hawaiian Hoary bat was once observed foraging above the pasture lands near the Kula Highway at the northeast edge of the Waiohuli parcel. Since the occurrence and abundance of the Hawaiian Hoary Bat on Maui has not been extensively studied, little is known about the life history of this endemic and endangered species. With the exception of this sighting, none of the mammals observed are listed as rare, threatened, or endangered species.

5. ***Archaeological Resources***

Of the 51 archaeological sites located on DHHL's Waiohuli parcel, six (6) of the sites are located within the limits of two (2) of the proposed subdivisions, while the other two (2) sites lie immediately adjacent to these subdivisions.

Site 2369 (overhang) was located within the Waiohuli Hikina Subdivision, while Site 2377 (walls); Site 2378 (wall); Site 2379 (enclosure); Site 2383 (wall); and Site 2388 (bridge) were located within the Waiohuli Uka Subdivision. See Appendix "C-4". In addition, Site 2367 (wall) and Site 2375 (complex) were located immediately adjacent to the proposed Waiohuli Uka and Waiohuli Hikina Subdivisions, respectively. Sites 2378, 2379, and 2375 were part of the data recovery work conducted in 1998 by Scientific Consultant Services, Inc. (SCS) for one (1) newly identified site and ten (10) of the 51 archaeological sites that were previously identified by the 1989 archaeological inventory survey conducted by Paul H. Rosendahl, Inc. (PHRI). As previously indicated, the data recovery report was approved by the State Historic

Preservation Division (SHPD) in March 2000. Refer to Appendix "C-1".

Recent discussions between SCS and the State Historic Preservation Division (SHPD) have indicated that further data collection is required for Site 2377. Accordingly, additional data recovery work is being conducted for Site 2377. Upon completion of data recovery, a report documenting the findings of the work will be submitted to the SHPD for review and approval.

During the interim, until Site 2377 is data recovered, a 15-foot buffer zone and construction barrier fencing (if required) will be placed around the site as an interim protection measure. Prior to any ground-altering activities, the buffer zone will be clearly marked with an archaeologist verifying that the construction barrier fencing (if required) is correctly placed. In addition, the DHHL will inform the appropriate lessees of the data recovery work and mitigative measures for the site.

The remaining five (5) archaeological sites within the proposed subdivisions and the two (2) sites immediately adjacent to these subdivisions were important solely for the information that they have yielded. As sufficient information about these sites has been documented by PHRI's 1989 inventory survey and by SCS's 1998 data recovery work, these sites are no longer significant for their information content. As such, no further archaeological work (i.e., data recovery, preservation) for these sites is required. The DHHL will notify Hawaiian homestead land awardees about the presence of archaeological sites on their lots, while the Waiohuli Hawaiian Homesteaders Association, as they have done to date for the Kula Residential Subdivision (Unit 1), will continue to educate awardees

of the nature of the sites and encourage and work with them to maintain the sites on their parcels.

As necessary, archaeological monitoring will be conducted for all ground-altering construction activities. Should any archaeological features, cultural artifacts, or human remains be inadvertently located during construction of the project, work in the immediate area of the find will be halted and the find will be protected from further disturbance. The SHPD will be immediately notified to determine the significance of the find and establish appropriate mitigative measures, if necessary. It should also be noted that the DHHL has no plans to develop the areas within the gulches of its Waiohuli parcel.

In light of the foregoing, the proposed action is not anticipated to have an adverse effect on significant historic sites.

6. *Cultural Impact Assessment*

a. *Historical Context*

The historical context for the subject area is based on information presented in "Archaeological Inventory Survey, Keokea and Waiohului Subdivisions", (Rosendahl, 1989).

Traditionally, Maui was divided into twelve (12) political districts, with nine (9) of those districts located in East Maui. The districts of Kahikinui, Honua'ula, and Kula were identified as lands that were "very arid" and where dryland agricultural fields were planted late in Hawaiian history. E.G. Handy notes that *"Kula was always an arid region, throughout its long, low seashore, vast stony kula lands, and broad uplands"* (Handy, 1940). Kula land is described by

Handy and Handy (1972) as *"open country, or plain, as distinct from valley . . . and has often been used as a term to distinguish between dry, or kula land and wet-taro land."*

During pre-contact times, lands in the Kula district were utilized for farming. In the uplands, dryland (non-irrigated) taro patches grew up to an altitude of 3,000 feet (Handy and Handy, 1972). While sweet potato crops grew well when conditions were right, frequent setbacks occurred in the form of grubs, caterpillars, blight, frost or too much sun (Malo, 1951). As a result, when the crops failed, the people of Makawao and Kula were burdened with famine. During these times, they were forced to subsist on "laulele, pualele, popolo and other weeds" (Kamakau, 1961).

Traditional Hawaiian agriculture was labor intensive and relatively restricted in the less than ideal environment of Kula. However, with the increased demand for provisions for the whaling industry and later, the gold miners in California, Kula experienced an increase in cultivation.

Kuykendall (1968) describes the period when Kula farming transitioned from subsistence crops to commodities:

> *"Before that time the whalers created a limited market for fresh vegetables, fresh meat, and fruit; the great increase in the number of whaleships after 1840 caused a corresponding increase in the demand for such products of the soil. In bulk and value, potatoes (sweet and Irish) ranked first in this traffic."*

Jarves describes the region as it appeared to him in July 1846:

> *"It ranges along the mountain (Haleakala) between 2,000 and 5,000 feet elevation, for the distance of 12 miles. The forest is but partially cleared, and the seed put into the rich virgin soil. The crop now in the ground is immense. The fields being all in blossom have a fine appearance, spreading as they do, over the broad surface of the mountain".*

From Kula, the potatoes were carried down to the shore and taken to Lahaina or were sold directly to ships which called at Kaleopolo. The influx of gold prospectors together with the absence of agriculture in California created a demand for potatoes and other vegetables, as well as for sugar, molasses, and coffee. C. Speakman (1978), in his book MOWEE describes the fervor of cash cropping:

> *"During the gold rush, hundreds of Hawaiians were going into business for themselves on Maui growing potatoes and hauling them to the port where they were snapped up and shipped to San Francisco. The Maui fields were called Nu Caliponi, or New California; potatoes were gold, and a fortune could be dug out of the ground by one man. The potato boom was short lived, and, when the prices dropped, the Hawaiians lost interest".*

During the 1840s, Chinese farmers leased lands in Kula. In addition to Irish potatoes, the Kula farmers planted corn, beans, onions, Chinese cabbage, round cabbage, sweet potatoes, wheat and other grains, and even cotton. Their

initial success compelled many Chinese to move to the region and lease land for farming. In addition to other parts of the island, they came to Kula from Honolulu and Kohala on the Big Island, as well as directly from China. Most of the Kula Chinese acquired their farm land by lease or deed from the haole ranchers or Hawaiian homesteaders. Much of this land was owned by the Hawaiian government, who in turn leased it to the ranchers, who then subleased it to the Chinese. In some instances, farmers made their lease payments in farm produce, in lieu of monetary transactions.

While the demand for Kula potatoes had diminished by the mid-1850s, the Chinese population continued to grow. For a period of 30 to 40 years, Kula supported a thriving community which included Chinese and English Schools, Christian churches, a Hung Men society, gambling joints, opium dens, general stores, and dozens of operating farms and cattle ranches (Mark, 1975).

By the 1880s, sections of lower Kula had largely become pasture for the booming cattle industry. Large sections of crown land were leased for grazing. In 1911, the Hawaiian government released a large amount of public land, and it became possible for citizens to purchase property in Kula. During the 1910s and 1920s, many families left Kula for various reasons: severe drought which devastated crops and livestock, soil which was reaching depletion level after years of harvesting and tilling, lack of educational opportunities for their children, and loss of land due to parceling homesteads. Later during the 20th century, lands of the project area were

primarily utilized as pasture land for cattle grazing (PHRI, 1989).

b. ***Cultural Perspectives***

Various methods were utilized in order to obtain a range of cultural perspectives. These measures included conducting and reviewing documented informant interviews, as well as historical documentary research and reviewing personal written accounts.

A cultural impact assessment prepared by Munekiyo & Hiraga, Inc. in 2002 for the DHHL's Keokea lands included interviews with long-time residents of the project area: Mr. and Mrs. Harley Ching and Mr. George Tanji. A summary of their interviews follows below.

(1) ***Mr. Harley Ching and Mrs. Florence Ching***

Mr. and Mrs. Ching are proprietors of the Ching Store, which is located just east of the DHHL property in Keokea. The store, founded by Mr. Ching's father, has been in its present location in Keokea since 1939. Both Mr. Ching and Mrs. Ching were born and raised in Keokea. Mr. Ching is past President of the Kwook Hing Society and remains active in this Chinese community society which was initially organized in the early 1900's. The Society is responsible for maintaining the Fook On Tong Cemetery in Waiohuli. Annual religious services are still conducted at the Fook On Tong Cemetery.

Both Mr. and Mrs. Ching attended Keokea School. They both recalled the small-scale intimacy of the school during the late 1930's and early 1940's. At that time there were four (4) teachers. Each teacher was assigned two (2) grade levels. Mr. Ching remembered his eighth grade class of eight (8)

students, consisting of three (3) girls and five (5) boys. Mrs. Ching recalled her eighth grade graduation being held at the Henry Fong Theater next to the store. (The Henry Fong Theater was a community gathering place where movies were shown.) Mrs. Ching noted that the graduation was one of the more memorable events of her growing up in Keokea.

Mr. Ching worked at the Kula Hospital (formerly known as the Kula Sanitarium). He worked his way up in the hospital's landscape and maintenance section, retiring in 1994 as the maintenance supervisor at the Hospital. Mr. Ching explained the primary function of the hospital was for the treatment of tuberculosis. The elevation of Keokea and its cool air was considered beneficial for patients.

Given its relatively remote location, the hospital was operated as a self-sufficient facility. The hospital operated its own vegetable garden, dairy and piggery. The dairy was located above the main hospital building while the vegetable garden and piggery were located makai on the DHHL property. Mr. Ching recalled receiving milk to take home from the dairy in one gallon milk cans.

In addition, the hospital had its own butcher shop. Beef from Haleakala Ranch was provided to the butcher shop for consumption at the hospital. Employees were permitted to purchase beef from the hospital butcher shop.

Mr. Ching remembered that the DHHL property was leased to Harold Rice for cattle grazing. As a member of the Valley Isle Gun Club, Mr. Ching remembered hunting on lands around the DHHL property.

(2) Mr. George Tanji

Mr. George Tanji is a second generation farmer in Keokea. His father started farming on lands which abut the subject DHHL property more than 60 years ago. Accordingly, Mr. Tanji grew up in the area

immediately adjacent to the proposed Keokea Agricultural Subdivision. Mr. Tanji started full time farming in 1957. He pointed out an area within the subject DHHL property which was referred to as the *"100 acres"*. The *"100 acres"* abuts his property and consisted of lands leased by the Kula Hospital from the DHHL for various hospital support activities. The *"100 acres"* contained the hospital vegetable garden which was used to grow vegetables for hospital consumption. Remnants of fence posts and fencing which demarcated the *"100 acres"* are still visible.

Mr. Tanji noted that beyond the *"100 acres"*, lands were leased to Harold Rice for cattle grazing.

In addition, a piggery, warehouse and slaughterhouse were operated on the *"100 acres"*. He recalled slaughtering occurred every Thursday. The *"100 acres"* also contained a lemon/lime orchard. As with the piggery and vegetable garden, the products from the orchard were used for hospital consumption.

Mr. Tanji recalled that vegetable cultivation in the garden was done with horse plow. On occasion he helped the vegetable garden staff by bringing down his tractor to help with the plowing. Horses which were used for the gardening operations, grazed on DHHL lands in an area north of and adjacent to Mr. Tanji's farm. Mr. Tanji noted that the *"100 acres"* was also used for grazing for dairy cows for the hospital.

The hospital incinerator was also located on the *"100 acres"*. Remnants of the incinerator can still be seen from the access road leading to Mr. Tanji's farm.

To the best of his recollection, Mr. Tanji believes the operations of the *"100 acres"* ceased sometime in the late 1950's. With the closing of the *"100 acres"*, materials and equipment were auctioned to the public. Mr. Tanji explained that he purchased (via auction) from the *"100 acres"* a potato shack which was used to store potatoes from the garden.

In viewing the landscape of the *"100 acres"* today, there is little evidence that this area was once an agricultural area used to support the Kula Hospital.

A recent interview with Mr. Roderick Fong is summarized below and includes information from the unpublished, written recollections of his late grand uncle, Nyuk Seong "Willie" Fong.

Mr. Roderick Fong

Roderick Fong was raised in the Waiohuli-Keokea area and is the current President and General Manager of Fong Construction Co., Ltd. The Fong family has lived in this area since his great grandfather Fong Nee emigrated from China with his wife and one (1) daughter around 1890. Once in Hawaii, his great grandparents worked as contract laborers for the Hawi sugar plantation in Kohala on the Big Island. After their three (3) year contracts expired, the family moved to Oahu where they started a strawberry farm. After two (2) years there, the family moved to Maui where Fong Nee leased 20 acres of Kula farmland and constructed a home where they eventually raised eight (8) children, four (4) boys and four (4) girls. In addition to sweet potatoes, dry land taro, string beans, and other types of vegetables, pumpkins and squashes were planted on the land that was too rocky for farming. Life on the farm was hard with no time for relaxation. To assist their parents, the children helped with weeding, planting, and harvesting. The children would also walk two (2) miles to school barefooted and attend Chinese language school before and after public school.

Later, Roderick's great grandfather started a grocery store in Keokea, which was also known as Chinatown. A grocery store in those days would sell a wide range of merchandise including such items as tobacco, Chinese liquor, men's clothing and women's fabrics, as well as pork and beef. Fong Nee later had an opportunity to lease some additional farmland in the area and not being satisfied with his Keokea store, decided to open up another store around the Ulupalakua area. Due to the scarcity of cash at the time,

most of the store's transactions involved trading merchandise for eggs, pigs, poultry, or produce. Fong Nee would then ship the bartered goods to an agent in Honolulu and exchange them for merchandise for his store. At that time, Keokea was a bustling gathering place for the Chinese community and others. In addition to the Fong's store, there were two (2) other stores in Chinatown, as well as a cook house, a Chinese language school, a Chinese Society house, and some opium dens and gambling parlors. On Sundays and holidays, people would come to Chinatown from outlying areas, such as Kanaio, Ulupalakua, and Waiakoa.

All of Fong Nee's children entered the business world either directly, by launching their own businesses, or indirectly, through marriage or by working for one of the family businesses. Roderick's grand uncle Harry formed a partnership with some friends and opened a store and gas station in Keokea around 1915. Harry later bought his partner's shares and purchased a 1-1/2 ton truck to carry freight for his store. Since he was the first person to own a truck in Kula, he was kept busy hauling farm products for shipment to Honolulu, as well as transporting building materials for contractors. After the end of World War I, the Territorial government opened up the homestead lands in Kula to all American citizens who were at least 21 years of age. Those who received homestead land awards remained, while those who didn't qualify moved elsewhere. Some families moved to Honolulu so their children would have a better education, while some returned to China. It was around this time that the Chinese population in Kula started to decline.

After Harry's death in 1920, his brother Henry took over the store and also started a construction company which was incorporated years later as Fong Construction Co., Ltd. By 1935, Henry moved the store down to its present location along the Kula Highway where his wife continued to be the storekeeper. The Fong General Store in Keokea is still owned and operated by the Fong family. Roderick's mother still resides in the family home that was constructed next to the general store. When World War II erupted, Henry opened a store in Wailuku and a restaurant and movie theater in Keokea. The theater was demolished in the 1960s, while the family restaurant has since been sold and

is now being rented to Grandma's Coffee House. After Henry's death, his son Danny (Roderick's father) was elected President and General Manager of the construction company. Under Danny's management, Fong Construction rose to become one of the island's largest construction companies. In addition, Robert Ling (Danny's sister's father-in-law), opened a service business in a building near the family's general store. Robert later sold his business to the Ching family who then converted the building for use as a general store and gas station.

Roderick's grand uncle Willie started work for the Kula Sanitarium as a truck driver in 1921. At the time, all supplies for the Sanitarium had to be hauled from Kahului and Paia. The trip to Kahului took an entire day. The Kula Sanitarium had its own dairy, piggery, poultry farm and produced their own milk, butter, pork, eggs, and vegetables. Around 1922, the Kula area suffered a severe drought. To keep the Sanitarium operating, water had to be hauled from Puunene by a water wagon drawn by a mule team. Willie would go as far as Makawao to pickup two (2) loads of water a day in his truck. Years later, Willie became interested in woodworking and eventually became well known for his handcrafted wooden Hawaiian bracelets.

Roderick's grand aunt Margaret married a prominent Chinese merchant and together, they operated a grocery store, meat market, and restaurant in old Kahului Town. In 1949, years after her husband's death, Margaret and two (2) of her sisters and their husbands incorporated the business under the name of Ah Fook Supermarket, which is still in business today.

While growing up, Roderick used to explore and play on the lands in the Waiohuli-Keokea area. Except for some land along the highway which was being farmed at the time, Roderick mentioned that the remaining lands in the area were used by Kaonoulu Ranch for cattle grazing until the late 1970s or early 1980s when this use ceased. While Roderick recalled seeing stone walls and rock formations on lands in the Waiohuli-Keokea area, he is not aware of, nor has he observed any cultural gathering, or subsistence practices occurring on the lands within the project area.

A recent interview with Mr. Perry Artates is summarized below. Mr. Artates was born and raised in the Keokea area and is currently the President and Chairman of the Board for the Waiohuli Homesteaders Association.

Perry Artates

Perry Artates was born in Keokea and lived in the area as a child. A native Hawaiian, Perry's mother was born and raised in Hana and resided in Keokea. At the age of 16, his mother started work for Kula Sanitarium. His mother was employed there for 43 years, while his father worked there for 36 years. Perry's maternal grandmother and grandfather were born and raised in Hana and Kaupo, respectively.

When Keokea School closed after Perry completed second grade, he attended Kula Elementary School. While living in Keokea, Perry recalled that Waiohuli was pastoral in nature but was not aware of the presence of archaeological sites at Waiohuli until DHHL's Kula Residential Subdivision was proposed for development. Perry was aware that DHHL's Keokea parcel contained archaeological sites since he found footprints embedded in lava rock when he used to play in the area around a former rubbish dump as a child. He recalled that his family used to cut wattle trees for fire wood to heat water for cooking. He does not recall native Hawaiian residents of the Waiohuli-Keokea area talking about archaeological sites and native Hawaiian practices occurring in the area. Perry mentioned that his uncles observed pueo (owls) flying in the area, but they did not observe any native plants or native wildlife in the area except for introduced species such as wild pigs and pheasants. He also mentioned that his uncles recalled anecdotal conversations with their elders which indicated that the area mauka of Kula Highway was used for cultivating corn and sweet potato and that the area was predominantly occupied by Chinese during the early 1900s.

Perry was a superintendent with Fong Construction for many years. During his tenure with Fong Construction, he supervised the grubbing of DHHL's Waiohuli parcel for establishing control points for the surveying of the property. Through his present work as a business representative and

construction resource specialist with the Operating Engineers (AFL-CIO, Local Union No. 3), Perry became involved with the development of DHHL's Waiohuli Subdivision. Currently, he is the president and chairman of the board of the Waiohuli Homesteaders Association and a member of the Maui County Cultural Resources Commission. Perry was also the first lessee to live in the Waiohuli Subdivision.

The Waiohuli Homesteaders Association board of directors includes an archaeological resources director who works with lessees to locate, preserve, and maintain known archaeological sites on their lots prior to the commencement of clearing and grubbing activities. The Association encourages archaeological monitoring for all future development of the Waiohuli parcel including the proposed project.

Since living in Waiohuli, Perry has not observed any traditional native Hawaiian practices occurring on the property.

c. Cultural Assessment

The 1989 archaeological inventory survey conducted by Paul H. Rosendahl, Inc. notes that the project area has been primarily used in the past as pasture land for cattle grazing. During construction of the project, archaeological monitoring will be conducted, as necessary, during all ground-altering construction activities. In addition, the mitigative measures contained in the approved preservation and burial treatment plans for the DHHL's Waiohuli parcel will ensure that the cultural resources in the project area will not be adversely impacted by the proposed action. In light of the foregoing, the proposed action is not expected to have an adverse effect on native Hawaiian cultural beliefs, practices, resources, or gathering rights.

7. ***Air Quality***

Emissions from construction equipment and other vehicles involved in construction activities may temporarily affect the ambient air quality within the immediate vicinity. However, these effects can be minimized by properly maintaining construction equipment and vehicles.

In addition, dust generated during construction, especially from earth-moving operations, such as clearing, excavating, and trenching, may also result in a temporary decrease in ambient air quality. Mitigation measures include utilizing dust barriers, waterwagons and/or sprinklers to control dust, and watering graded areas after construction activity has ceased for the day and during weekends and holidays.

On a long-term basis, once construction activities have been completed, project-related vehicular traffic will generate automotive emissions. However, these emissions are not expected to adversely impact local and regional ambient air quality conditions.

8. ***Noise Characteristics***

Ambient noise conditions will be temporarily affected by construction activities. Heavy construction equipment, such as bulldozers, dump trucks, front-end loaders, and material-transport vehicles, are anticipated to be the dominant noise-generating source during the construction period.

Proper equipment and vehicle maintenance are anticipated to minimize noise levels. In addition, the use of equipment mufflers or other noise attenuating equipment may be necessary if noise

levels are determined to be excessive. All construction activities are expected to be limited to daylight working hours.

Once completed, vehicles traveling along the region's roadways will be the primary source of long-term noise in the project area. However, vehicular traffic is not expected to generate any significant and unfavorable noise conditions.

9. *Scenic and Open Space Resources*

The Kula region includes a diverse range of scenic and open spaces. Cultivated fields, pastoral ranch lands, and vacant, undeveloped properties typify the rural open space character of the region. The project sites are situated along the southwestern slopes of Haleakala between the elevations of 2,970 to 2,150 feet above mean sea level. Due to their elevations and depending on topography and vegetation, views of the Central Maui plain, offshore islands, and coastline are available from the project sites.

The project sites are not part of a scenic corridor and are not expected to have an adverse impact upon the visual character of the surrounding area.

B. *IMPACTS TO THE SOCIO-ECONOMIC ENVIRONMENT*

1. *Community Character*

The community character of the Makawao-Pukalani-Kula region is generally thought of as rural and agricultural. Flower and vegetable farms comprise the agricultural fabric of the region and range from small growers raising truck crops to larger operations cultivating crops for export. Although there are a few large working ranches, ranching activities are generally characterized by smaller

family operations. Small neighborhood enterprises provide commercial goods and services to the local community. In addition to individually developed residential parcels, the Kula region also includes areas which contain low-density rural and agricultural subdivisions.

The project sites encompass a total area of approximately 122.0 acres and will include 99 residential houselots ranging in size from about 0.5 to 1.0 acre.

A number of agricultural-zoned parcels are situated in the vicinity of the project sites along the mauka side of Kula Highway. Five (5) privately owned Kuleana parcels surrounded by the Waiohuli parcel are similarly zoned and range in size from 1.3 to 8.2 acres. Along Kula Highway, across from the project sites, rural-zoned parcels range in size from 0.2 to 15.2 acres. Within the immediate vicinity, single-family dwellings occupy at least one-half of the parcels within proximity of the project sites.

With lot sizes ranging from approximately 0.5 to 1.0 acre, the proposed subdivisions will maintain the rural, residential character of the Kula region. At full build-out, the 99 residential houselots will add to the diversity of residential settings in the Makawao-Pukalani-Kula region.

2. ***Population and Economy***

The population of the island of Maui has exhibited relatively strong growth over the past decade, with the 2000 population of 117,644 reflecting a 28.8 percent increase over the 1990 population of 91,361. Population gains were especially pronounced in the 1970's

as the rapidly developing visitor industry attracted many new residents to Maui in search of employment.

Just as the island's population has grown, the resident population of the Upcountry region has also increased in the last decade. The 2000 resident population of the Makawao-Pukalani-Kula region was 21,571, while the population in 1990 was 18,923. Regional projections for the years 2010 and 2020 reflect population estimates of 25,237 and 28,974, respectively. Compared to 2000, these estimates reflect increases of approximately 17 percent and 34 percent for the years 2010 and 2020, respectively (SCS, June 2000).

From a regional perspective, Wailuku and Kahului serve as the population and employment center of Maui. In the long-term, the proposed action is not anticipated to be a significant employment source.

On a short-term basis, the proposed action will support construction and construction-related employment.

Once fully developed and occupied, the subdivision's residents are anticipated to contribute to the long-term support of the island economy through their purchases of goods and services from local businesses and service providers.

3. ***Police and Fire Protection***

The Maui Police Department's (MPD) Wailuku headquarters, located approximately 19.0 miles from the project sites, services the Makawao-Pukalani-Kula region. In addition, a MPD substation

in Makawao is located about 8.0 miles to the north of the project sites. Additional support, if required, is provided by officers from the Haiku and Paia patrol districts.

Fire protection services for the Upcountry region are provided by the Maui Fire Department's (MFD) Kula and Makawao station. The Kula fire station is situated approximately 3.0 miles to the northeast of the project sites, while the Makawao station is approximately 8.0 miles to the north. Additional assistance, if required, is provided by the MFD's Paia station about 14.0 miles to the north, and its Kahului and Wailuku stations about 16.0 and 19.0 miles to the northwest, respectively.

The project sites are located within the 2.0 to 3.0 mile residential service radius of the Kula fire station.

The proposed action is not anticipated to adversely affect police and fire protection services in the region.

4. ***Medical Facilities***

Kula Hospital is located approximately 2.0 miles from the project sites and provides out-patient medical services for the Kula region. In addition, several medical and dental care facilities are located in Makawao and Pukalani to serve Upcountry residents.

The proposed action is not expected to increase the need for additional medical care services in the Upcountry region.

5. ***Solid Waste***

Solid waste from the Upcountry region is currently transported to the Central Maui Landfill near Puunene, approximately 9.0 miles from the project sites.

On a short-term basis, construction activities will require the disposal of construction-related solid waste. The DHHL will work with the contractor to minimize the amount of solid waste generated during the construction of the project. As appropriate, a private construction waste disposal facility will be utilized by the contractor for the disposal of waste materials.

Upon completion of the project, solid waste collection and disposal services will be provided by the County of Maui. The proposed action is not anticipated to adversely impact solid waste collection and disposal services and facilities.

6. ***Schools***

Based on a total of 99 total houselots, the State Department of Education (DOE) estimates that the proposed action is projected to generate 48 students in Grades K to 5; 15 students in Grades 6 to 8; and 17 students in Grades 9 to 12 (personal communication with Keith Kameoka, February 27, 2004). The construction of new homes and the occupancy of the completed dwellings are expected to occur over a 10 to 15 year time span based on the DHHL's previous experience with other development projects. In this regard, the student counts projected by the DOE would depend on the construction and occupancy of homes by individual lessees. As such, the effect on school facilities would not be immediate and would be gradually spread out over a number of years. In light of

the foregoing, the projected number of students generated by the proposed action is not anticipated to have an adverse effect on school facilities. The DHHL will update the DOE on the status and development of the project to assist them with its school facilities and program planning.

7. *Recreational Facilities*

County recreational facilities in the Upcountry region consist of five (5) neighborhood and three (3) district parks. Neighborhood parks in the Kula area include Kula Community Center, Waiakoa Gym, Harold Rice Memorial Park, and Keokea Ball Park.

Dedicated in 1994, Kula Recreational Center is located approximately 3.0 miles from the project sites. This 10.3-acre facility serves as the region's only district park and includes multi-purpose ball fields, picnic sites, a fitness area with exercise stations, paved pathways, a comfort station, and parking areas.

DHHL's Kula Residential Subdivision includes a 16-acre park site which will be set aside for future development. In the short-term, the proposed action is not anticipated to generate an immediate demand for recreational facilities. On a long-term basis, the development of DHHL's Kula Residential Subdivision park site will expand the Upcountry region's network of recreational facilities, as well as accommodate the recreational needs of the community.

C. *IMPACTS TO THE INFRASTRUCTURE*

1. *Roadways*

Access to the project sites is presently provided by Kula Highway, Pueo Drive and Lauie Drive. The roadway system for the

proposed project will consist of collector streets, minor streets and cul-de-sacs. The collector streets will have a right-of-way width of 50 feet with a travelway and lane widths of 24 and 12 feet, respectively. The minor streets will have a right-of-way width of 40 feet with travelway and lane widths of 22 and 11 feet, respectively. A pavement justification report will be prepared for the required pavement sections. Concrete pavement sections will be used for road slopes that exceed 12 percent, the paving limits of asphaltic concrete. Appropriate traffic control measures will be utilized during the construction period to minimize impacts to traffic flow and provide for the safe passage of vehicles.

A Traffic Impact Analysis Report (TIAR) has been prepared for the proposed project. See Appendix "E". The TIAR uses accepted methods for analyzing signalized and unsignalized intersections, as set forth by the 2000 Highway Capacity Manual.

Two (2) scenarios were evaluated for base year 2007 traffic without the project. Scenario A examined the traffic impacts of known developments near the project that were recently completed or under construction at the time of the report. Scenario B reviewed other known future developments near the project that are not currently under construction, but may be completed by year 2007. The projects in Scenario A were included in the traffic projections for Scenario B as well.

Conclusions

The following are the conclusions of the traffic study for base year 2007 Scenario A without traffic generated by the proposed project.

- Known developments near the project that have been recently completed or are currently under construction could potentially generate approximately 494 and 192 total trips during the AM and PM peak hours of traffic, respectively.

- Installation of a traffic signal system at the Haleakala Highway/Old Haleakala Highway (Western Intersection) will be required to accommodate the anticipated demand. With the installation of a traffic signal system at this intersection, northbound left-turn and westbound through traffic will operate at LOS F during the AM peak hour of traffic. This is assuming phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are served by separate traffic signal phases. It may be possible to allow these movements to proceed through the intersection since the additional westbound lane on Haleakala Highway resulting from roadway widening would originate by providing a receiving lane for northbound left-turn traffic from Old Haleakala Highway. Using this alternate signal phasing would result in all individual movements at the Haleakala Highway/Old Haleakala Highway (Western Intersection) operating at LOS D or better during the AM and PM peak hours of traffic.

- Haleakala Highway will be approaching capacity within the study area with some movements at the Makani Road and Makawao Avenue intersections operating at LOS E during the AM peak hour of traffic even with the installation of a traffic signal system at the Makani Road intersection.

- At the Kula Highway/King Kekaulike High School (KKHS) Driveway/Residential Driveway intersection, the westbound left-turn from the KKHS driveway approach will operate at LOS F during the AM and PM peak hours of traffic. In addition, eastbound traffic on the shared residential driveway approach will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic, and westbound right-turn traffic from KKHS will operate at LOS E during the AM peak hour of traffic. Traffic volumes at this intersection are not likely to warrant installation of a traffic signal system. It is not uncommon, however, for a low volume side street to experience long delays especially when trying to cross or execute a left-turn onto a major regional facility such as Kula Highway. In addition, few vehicles are projected to use the shared driveway approach,

ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic.

- With the installation of a traffic signal system, all individual movements at the Kula Highway/A'apueo Parkway intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

- A traffic signal system at the Kula Highway/Omaopio Road intersection is likely to be warranted. Monitor traffic volumes at this intersection and install a traffic signal system when warranted. With the installation of a traffic signal system, all individual movements at the Kula Highway/Omaopio Road intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

The following are the conclusions of the traffic study for base year 2007 Scenario B without traffic generated by the proposed project.

- Construction of the known future developments near the project that will or may be completed by the base year could potentially generate approximately 1,339 and 2,180 total trips during the AM and PM peak hours of traffic, respectively.

- Haleakala Highway will be operating at overcapacity conditions between the Haleakala Highway/Old Haleakala Highway (Western Intersection) and Five Trees Junction with some movements at the Haleakala Highway/Old Haleakala Highway (Western Intersection), Haleakala Highway/Makani Road intersection, Haleakala Highway/Makawao Avenue intersection and the Five Trees Junction operating at LOS E or LOS F.

- With widening of Haleakala Highway from three (3) to four (4) lanes (two (2) lanes in each direction) from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction, installation of a traffic signal system at the Haleakala Highway/Old Haleakala Highway (Western Intersection) will be required to accommodate the anticipated demand. With these improvements, the northbound left-turn at the Haleakala Highway/Old Haleakala Highway (Western Intersection) will operate at LOS E and westbound through

traffic will operate at LOS F during the AM peak hour of traffic. This is assuming phasing such that the traffic signal will stop all the westbound through traffic on Haleakala Highway and assign the right-of-way to the northbound left-turn traffic on Old Haleakala Highway (i.e. creating a separate phase for each approach). It may be possible to allow these movements to proceed through the intersection simultaneously if a median acceleration lane is provided to receive the northbound left-turning vehicles from Old Haleakala Highway. In this case, vehicles turning left from northbound Old Haleakala Highway onto westbound Haleakala Highway would accelerate to the posted speed limit and then merge with traffic on Haleakala Highway further west of the intersection. The westbound through vehicles would not be controlled by the traffic signal system and would be allowed to proceed continuously. Using this alternate signal phasing would result in the Haleakala Highway/Old Haleakala Highway (Western Intersection) operating overall at LOS B during the AM peak hour of traffic and LOS A during the PM peak hour of traffic with all individual movements operating at LOS D or better.

- Due to the high volume of northbound through vehicles (560 vehicles) at the Haleakala Highway/Makawao Avenue intersection, a full eight-phase traffic signal will be required. With the widening of Haleakala Highway, as described earlier, and provision of a protected left-turn phase for traffic on the minor street approaches, some movements at the Haleakala Highway/Makawao Avenue intersection will operate at LOS E during the PM peak hour of traffic. Lengthening the right-turn and left-turn lanes and thus widening of the roadway on the Makawao Avenue approaches will be required.

- The Kula Highway/A'apueo Parkway intersection will be operating at overcapacity conditions. Due to the high volume of eastbound vehicles turning left from A'apueo Parkway (710 vehicles) during the PM peak hour of traffic, an additional left-turn lane on the eastbound A'apueo Parkway approach to Kula Highway and widening of this approach will be required. Widening of Kula Highway would be required to receive vehicles turning left from A'apueo Parkway onto Kula Highway. With widening of Kula Highway from two (2) to four (4) lanes (two (2) lanes in each direction) from the Five Trees Junction to the Kula

Highway/A'apueo Parkway intersection and installation of a traffic signal system, all individual movements at the Kula Highway/A'apueo Parkway intersection will operate at LOS D or better.

- With widening of Haleakala Highway and widening of Kula Highway, as described earlier, and adjustment of the traffic signal timing at the Five Trees Junction to be coordinated with the modified signal at the Haleakala Highway/Makawao Avenue intersection, all individual movements at the Five Trees Junction will operate at LOS D or better during the AM and PM peak hours.

- With widening of Kula Highway to four (4) lanes as described earlier, the Kula Highway/King Kekaulike High School (KKHS) Driveway/Residential Driveway intersection westbound left-turn from the KKHS driveway approach and eastbound traffic on the shared residential driveway approach will operate at LOS F during the AM and PM peak hours of traffic. Traffic volumes at this intersection are not likely to warrant installation of a traffic signal system. It is not uncommon, however, for a low volume side street to experience long delays, especially when trying to cross or execute a left-turn onto a major regional facility such as Kula Highway. In addition, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic.

- With the installation of a traffic signal system, as proposed for Base Year 2007 Scenario A, all individual movements at the Kula Highway/Omaopio Road intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

The following are the conclusions of the traffic study for the year 2007 with the project.

Year 2007 With the Project

- Development of the project could potentially generate approximately 42 and 38 total trips during the AM and PM peak hours of traffic, respectively.

- Traffic operations within the study area will be similar to base year 2007 Scenarios A and B with mitigative measures.

Recommendations

The following are the recommendations of the traffic study for Scenario A.

a. ***Without Project-Generated Traffic***

- Install traffic signal systems at the Haleakala Highway/Old Haleakala Highway (Western Intersection) and Haleakala Highway/Makani Road intersection. Interconnect and synchronize the traffic signal systems at the Haleakala Highway/Old Haleakala Highway (Western Intersection), Haleakala Highway/Makani Road, Haleakala Highway/Makawao Avenue, and the Five Trees Junction.

- Install a traffic signal system at the Kula Highway/A'apueo Parkway intersection.

- Monitor traffic volumes at the Kula Highway/Omaopio Road intersection and install a traffic signal system when warranted.

In addition to the recommended improvements for Base Year 2007 Scenario A, the following are the recommendations of the traffic study for Scenario B.

- Widen Haleakala Highway to four (4) lanes, (two (2) lanes in each direction) from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction.

- At the Haleakala Highway/Old Haleakala Highway (Western Intersection), provide a westbound median acceleration lane on Haleakala Highway to receive northbound left-turns from Old Haleakala Highway. Provide a two-phase traffic signal that would stop only the eastbound through traffic on Haleakala Highway

and assign the right-of-way to the northbound left-turn from Old Haleakala Highway.

- Revise the traffic signal system at the Haleakala Highway/Makawao Avenue intersection to provide a full eight-phase traffic signal system with a protected left-turn phase for traffic on the minor street approaches. Investigate the need for lengthening the exclusive right-turn and left-turn lanes and thus widening of the roadway on the Makawao Avenue approaches to accommodate the anticipated demand.

- Widen Kula Highway to four (4) lanes (two (2) lanes in each direction) from the Five Trees Junction to A'apueo Parkway.

- Provide an additional left-turn lane on the eastbound A'apueo Parkway approach to Kula Highway.

b. With Project-Generated Traffic

There are no specific recommendations of the traffic study with traffic generated by the project with Scenario A or B.

2. Water

A preliminary engineering report has been prepared for the proposed project. Refer to Appendix "D". The water system for the proposed subdivisions will be designed and constructed in accordance with the Water System Standards for the State of Hawaii.

At full build out, the average daily demand for the proposed project will be approximately 59,400 gallons per day. This estimate is based on a total of 99 homes and the County's water consumption rate of 600 gallons per unit per day for a single-family dwelling. Waterlines for the 99 proposed house lots (11 in Service Zone 1,

52 in Service Zone 2, and 36 in Service Zone 3) will be connected to their respective reservoirs.

The proposed water distribution system will connect to existing water mains located within the Kula Residential Subdivision's existing roadways. Water mains will be provided within proposed roadways with laterals providing service to each proposed house lot. The Waiohuli Uka Subdivision includes all three (3) existing onsite service zones (Zones 2, 3, and 4) and extends into the upper offsite service zone (Zone 1). The Waiohuli Hikina Subdivision also encompasses the three (3) onsite service zones (Zones 2, 3 and 4), while the Lot 134 Subdivision exists entirely within the offsite service zone (Zone 1). The Lot 134 Subdivision will be fed directly from the existing 8-inch offsite line along Kula Highway. Fire flow to the upper most region of onsite Service Zone 2 will also be supplied by offsite Service Zone 1.

The proposed project is not anticipated to have an adverse effect on water sources, storage facilities, and distribution and transmission systems.

3. ***Wastewater***

A preliminary engineering report has been prepared for the proposed project. Refer to Appendix "D". At full build out, the proposed project is expected to generate about 34,650 gallons of wastewater per day based on the wastewater contribution flow standards of the County Department of Public Works and Environmental Management (DPWEM). This estimate is based on a total of 99 homes and the DPWEM's rate of 350 gallons per unit per day for a single-family dwelling.

The proposed subdivisions will utilize individual wastewater systems for each houselot. Since the proposed action will exceed the 50-lot limit established by the DOH, a variance was approved by DOH for the use of individual wastewater systems. DOH also approved the use of individual wastewater treatment systems to service the proposed project's 99 lots. Refer to Appendix "D-1". All wastewater plans will conform to applicable provisions of the DOH's Administrative Rules, Chapter 11-62, "Wastewater Systems". The dwellings will connect to the County sewer system when service becomes available.

4. ***Drainage and Erosion Control***

The drainage plan for the proposed project will include paved swales along roadways, diversion ditches and swales, underground drainage system and roadway culverts. The underground system will include drain inlets, drain manholes, piping systems and outlet structures. Refer to Appendix "D".

In general, the Rational Method will be used to determine the onsite storm water runoff quantities. The roadway and diversion swales and underground drainage system will be designed for the 10-year/1-hour storm and 50-year/1-hour storm.

The Natural Resources Conservation Service (NRCS) Hydrograph methods will be used to determine the peak offsite storm runoff (100-year/24-hour storm) from areas greater than 100 acres and to analyze the hydraulics for the project's proposed culvert crossings.

There are two (2) concrete box culverts proposed to be located within the Waiohuli Uka Subdivision. Refer to Appendix "D". Both

culverts are designed to handle peak runoff during a 100-year/24-hour storm. Culvert No. 67 will be located beneath Roadway 67 and directs water from Waiohuli Bridge on the east side of the property to the west side. The peak runoff based on a 100-year storm flow passing through this culvert is expected to be approximately 1,520 cubic feet per second (cfs). Culvert No. 68 will be located beneath Roadway 68 and channels water from Culvert No. 2 located along Kula Highway in a southeasterly to northwesterly direction. A flow of 480 cfs is expected to pass through this culvert during a 100-year/24-hour storm. Both culverts will be made of precast reinforced concrete.

In June 2003, the U.S. Army Corps of Engineers conducted a site visit of the project area, including the locations for Culvert Nos. 67 and 68. Based on this visit, the Corps determined that there are no waters of the U.S., including wetlands, which would be affected by the project; therefore, a Department of the Army permit will not be required for the project (see Chapter X, U.S. Department of the Army letter dated June 20, 2003).

The drainage system for the proposed project will be designed to produce no adverse runoff impacts to downstream and adjacent properties.

Construction of the proposed project will be conducted in accordance with applicable soil erosion and sedimentation control standards. Grading for the project will involve excavation and embankment within the roadway right-of-way and within some of the adjacent onsite lots. Erosion control measures will be utilized during construction to minimize soil loss and erosion hazards.

Examples of erosion control measures that may be implemented during construction of the project include, but are not limited to the following:

1. Minimize the time of construction;
2. Retain existing ground cover as long as possible in order to complete construction;
3. Implement the early construction of drainage control features;
4. Use temporary area sprinklers in non-active construction areas when ground cover is removed;
5. Utilize onsite waterwagons for immediate sprinkling, as needed, in active construction areas;
6. Use temporary berms, cut-off ditches, or silt screen fencing, where needed, to control soil erosion;
7. Water graded areas thoroughly after construction activity has ceased for the day, as well as on weekends and holidays;
8. All cut and fill slopes shall be sodded or planted immediately after grading work has been completed;
9. Upon completion of finish grading, cover all exposed areas with grass or an appropriate cover material; and
10. Ensure that adequate measures are implemented to prevent sediment-laden runoff from leaving the project site.

5. Electrical and Telephone Services

The installation of overhead lines for electricity and street lighting, as well as the underground installation of telephone lines will be coordinated with the respective utility companies. The proposed power and telephone systems will tie into existing systems located within the Kula Residential Subdivision's existing roadways. The proposed action is not anticipated to have an adverse impact upon electrical and telephone services in the Upcountry region.

D. CUMULATIVE AND SECONDARY IMPACTS

Cumulative impacts are defined as impacts resulting from other past, present, and reasonably foreseeable future actions, while secondary

impacts are impacts resulting from indirect actions. Cumulative impacts related to the development of the proposed subdivisions include increases in traffic, as well as vehicle-generated noise and emissions.

Based on estimated traffic volume projections and an analysis of intersections in the region, traffic-related impacts are not anticipated to be adverse. Although, project-related traffic will generate noise and emissions, these impacts are not expected to significantly affect ambient air quality or result in any adverse noise conditions.

Secondary impacts associated with the development of the proposed subdivisions include the effect of induced growth in the region, as well as additional requirements for infrastructure and public services. These long-term effects are not anticipated to result in any significant adverse impacts.

It should be noted that at the present time, DHHL has not programmed any commitments for any larger actions in the future.

Chapter IV

Land Use Controls

IV. LAND USE CONTROLS

A. REGULATORY CONTEXT

The Hawaiian Homes Commission Act of 1920, as amended (the Act), notes that the policy of the Act is to enable native Hawaiians to return to their lands in order to fully support self-sufficiency for native Hawaiians and the self-determination of native Hawaiians in the administration of the Act, as well as the preservation of the values, traditions, and culture of native Hawaiians. *In addition, the principal purposes of the Act include* but are not limited to:

1. Establishing a permanent land base for the benefit and use of native Hawaiians, upon which they may live, farm, ranch, and otherwise engage in commercial or industrial or any other activities as authorized by the Act;
2. Placing native Hawaiians on the lands set aside under the Act in a prompt and efficient manner and assuring long-term tenancy to beneficiaries of the Act and their successors;
3. Preventing alienation of the fee title to the lands set aside under the Act so that these lands will always be held in trust for continued use by native Hawaiians in perpetuity;
4. Providing adequate amounts of water and supporting infrastructure, so that homestead lands will always be usable and accessible; and
5. Providing financial support and technical assistance to native Hawaiian beneficiaries of this Act so that by pursuing strategies to enhance economic self-sufficiency and promote community-based development, the traditions, culture and quality of life of native Hawaiians shall forever be self-sustaining.

Upon the passage of the Act, all available lands immediately assumed the status of Hawaiian home lands and became under the control of the Department of Hawaiian Home Lands (DHHL) to be used and disposed of in accordance with the provisions of the Act. As provided for by the Act, Hawaiian home lands used and disposed of under the Act are exempt from State statutes, County ordinances, and County charter

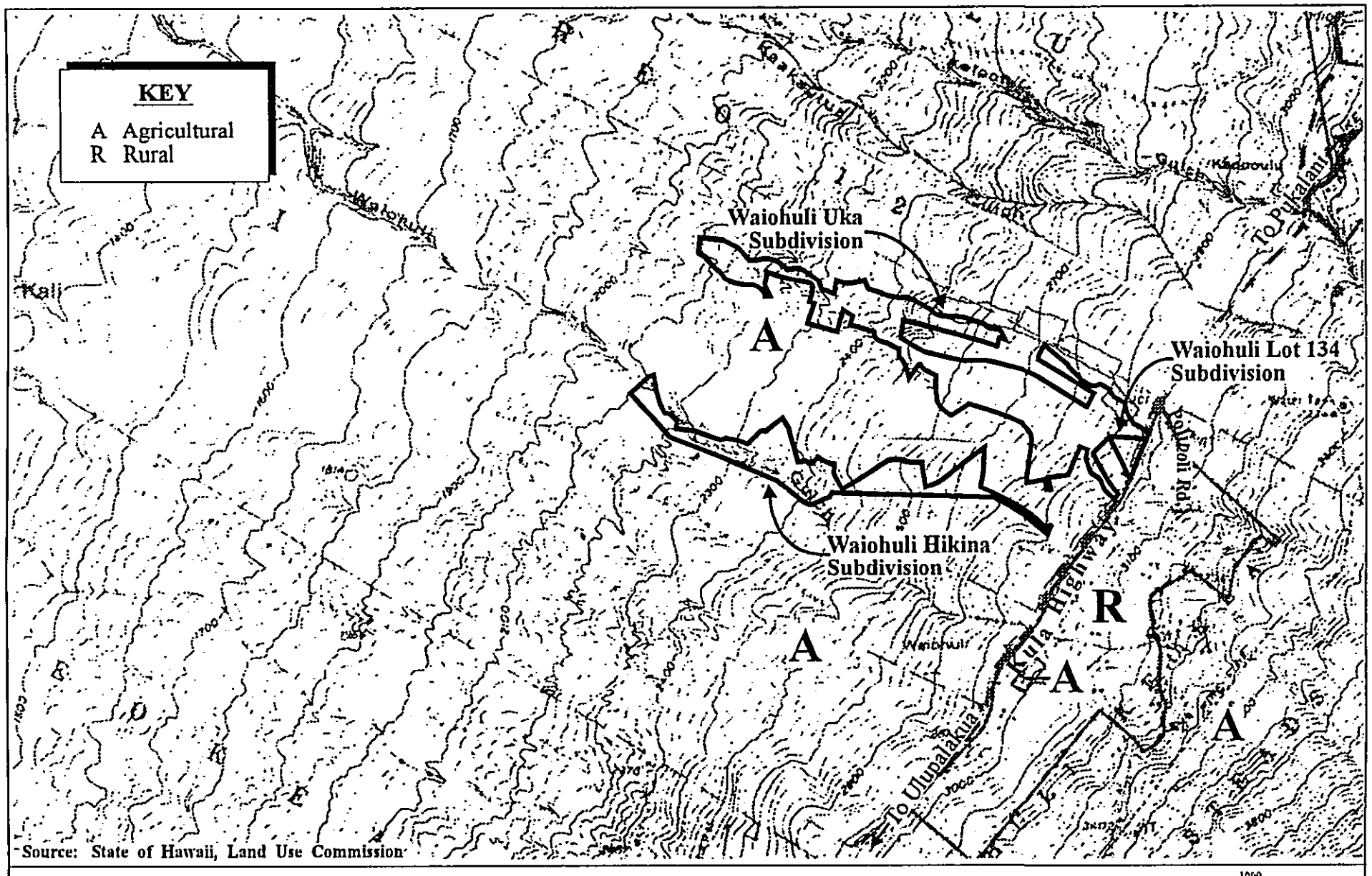
provisions regarding land use, including County zoning, planning and subdivision regulations.

The lands underlying the proposed subdivisions are designated "Agricultural" by the State Land Use Commission and "Agriculture" by the Makawao-Pukalani-Kula Community Plan. See Figure 6 and Figure 7. In addition, these lands are zoned for "Agricultural District" uses by the County of Maui.

With the exception of certain specified exemptions, the proposed project will be implemented in accordance with applicable County standards. As previously noted, the Hawaiian Homes Commission Act of 1920, as amended, places Hawaiian home lands under the control of the DHHL. As provided for by the Act, Hawaiian home lands used and disposed of for the purposes of the Act are exempt from State and County land use regulations.

The proposed action advances the use of Hawaiian home lands for settlement by native Hawaiians and is in accordance with the provisions promulgated by the Act. While the proposed action will result in changes in land use density, the overall rural, residential character of the project is not considered inconsistent with surrounding uses.

Additionally, DHHL is in the process of finalizing its Maui Island Plan, which provides a comprehensive resource for planning and managing the more than 31,000 acres of DHHL lands on Maui. The Maui Island Plan examines the infrastructure needs and opportunities from an island-wide perspective, gauges beneficiary needs and demands, proposes plans for both homesteading and non-homesteading uses, estimates the cost for both on- and off-site infrastructure and, based on these findings, will



Source: State of Hawaii, Land Use Commission

Figure 6

Proposed Hawaiian Homestead Land Subdivisions at Waiohuli

State Land Use District Classifications

0 500 1000 2000 Feet

MUNEKIYO & HIRAGA, INC.

Prepared for: State of Hawaii, Dept. of Hawaiian Home Lands

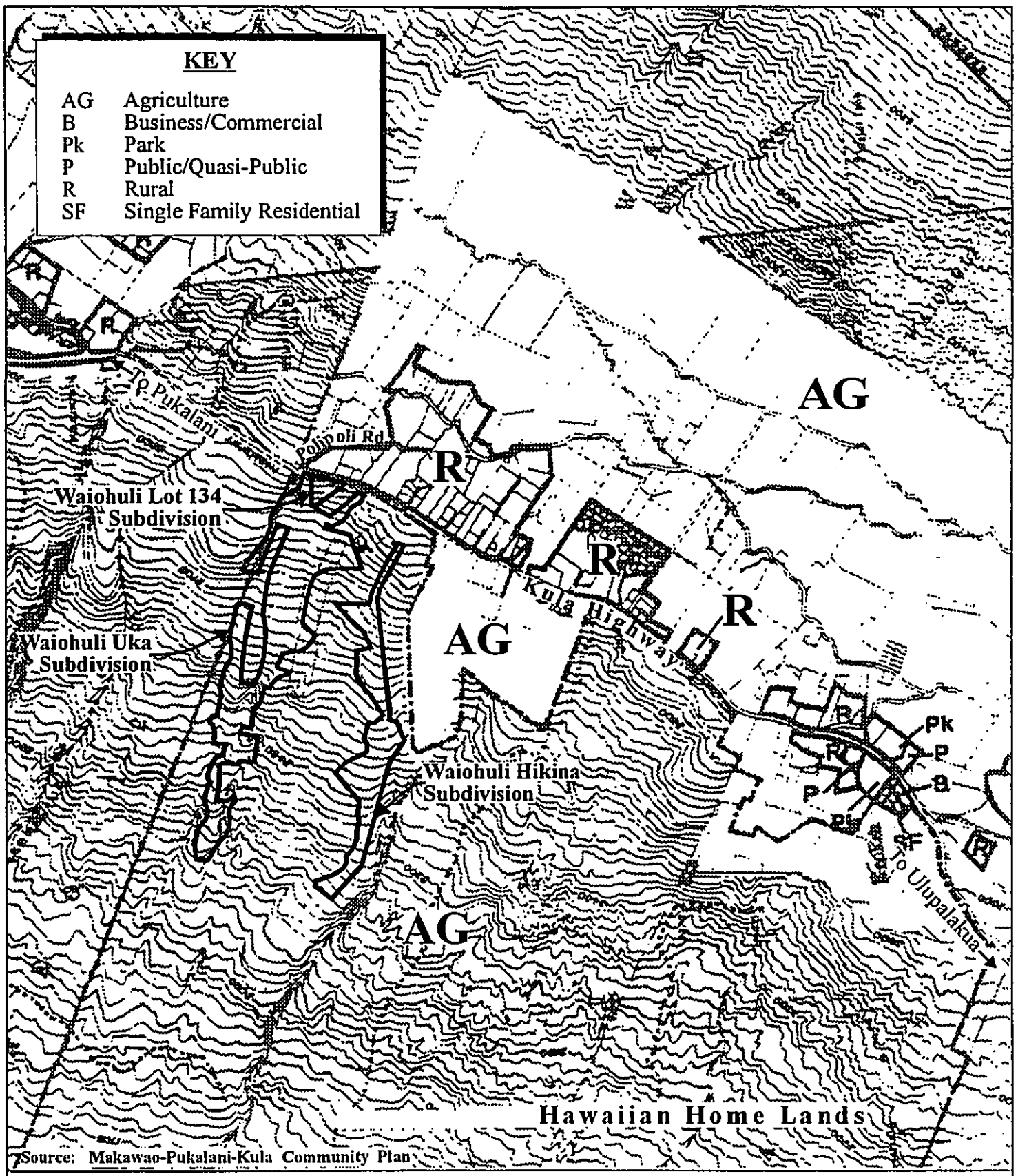


Figure 7 Proposed Hawaiian Homestead Land Subdivison at Waiohuli

Makawao-Pukalani-Kula Community Plan Land Use Designations

NOT TO SCALE

Prepared for: State of Hawaii, Dept. of Hawaiian Home Lands

MUNEKIYO & HIRAGA, INC.

identify priority areas for homestead development. A survey of qualified Maui applicants, community meetings and discussions with public agencies, private companies, community groups and other stakeholders were held in order to coordinate activities related to the development and use of DHHL land on Maui.

Preliminary results of the Maui Island Plan indicate that the development of the DHHL lands in the Keokea/Waiohuli area are a priority based on: (1) the beneficiary survey indicated that a majority of the beneficiaries preferred the Upcountry region for residential homestead, (2) the opportunity to share existing and future infrastructure exists with the existing neighboring DHHL "Unit1" residential lots (321 lots), and (3) that the 500,000 gallons per day water credit agreement with the County of Maui, Department of Water Supply would allow for the development of up to 343 units in the area.

B. ***HAWAII COASTAL ZONE MANAGEMENT PROGRAM***

The Hawaii Coastal Zone Management Program (HCZMP), as formalized in Chapter 205A, HRS, establishes objectives and policies for the preservation, protection and restoration of natural resources of Hawaii's coastal zone.

As set forth in Chapter 205A, HRS, this section addresses the project's relationship to applicable coastal zone management considerations.

1. ***Recreational Resources***

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

a. Improve coordination and funding of coastal recreational planning and management; and

b. Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

(i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

(ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to, surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the state for recreation when replacement is not feasible or desirable;

(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;

(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;

(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;

(vi) Adopting water quality standards and regulating point and non-point sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;

(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and

(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of Section 46-6, HRS.

Response: The project sites are approximately 4.0 miles from the coastline. As such, the proposed action is not expected to impact coastal recreational opportunities or affect existing public access to the shoreline.

2. ***Historical/Cultural Resources***

Objective: Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies:

a. Identify and analyze significant archeological resources;
b. Maximize information retention through preservation of remains and artifacts or salvage operations; and
c. Support state goals for protection, restoration, interpretation, and display of historic resources.

Response: The proposed project is not anticipated to have an adverse effect on historical or cultural resources. Data recovery for Site 2377 (terraces and walls) is being conducted. Prior to ground-altering construction activities, and until Site 2377's data is recovered, a buffer zone and construction barrier fencing (if required) will be placed around the site. Upon completion of data recovery, a report documenting the findings of the work will be submitted to the SHPD for review and approval. As necessary, archaeological monitoring will be conducted during all ground-altering construction activities. Should any archaeological features, cultural artifacts, or human burials be inadvertently discovered during construction activities, work in the vicinity of the find shall be immediately halted and the find protected from further disturbance. The SHPD will be promptly notified to ascertain the significance of

the find and establish appropriate mitigative measures, if necessary.

3. ***Scenic and Open Space Resources***

Objectives: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies:

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

Response: The proposed subdivisions will be designed to ensure visual compatibility with the surrounding land uses. The proposed action is not contrary to the objectives and policies for scenic and open space resources.

4. ***Coastal Ecosystem***

Objective: Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.

Policies:

a. Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;
b. Improve the technical basis for natural resource management;

c. Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;
d. Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
e. Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

Response: The proposed action is not expected to adversely impact coastal ecosystems. Drainage system improvements will be designed in accordance with applicable regulatory standards to ensure that there are no adverse effects to adjacent or downstream properties.

In addition, appropriate erosion control measures will be implemented to minimize the effects of stormwater runoff during construction of the project and to ensure that coastal ecosystems are not adversely impacted.

5. *Economic Use*

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies:

a. Concentrate coastal dependent development in appropriate areas;
b. Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social,

visual, and environmental impacts in the coastal zone management area; and

c. Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
   (i) Use of presently designated locations is not feasible;
   (ii) Adverse environmental effects are minimized; and
   (iii) The development is important to the State's economy.

Response: The proposed action provides for the use and disposition of Hawaiian home lands for settlement by native Hawaiians in accordance with the provisions promulgated by the Hawaiian Homes Commission Act of 1920, as amended.

6. ***Coastal Hazards***

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.

Policies:

a. Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and point and nonpoint source pollution hazards;
b. Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint pollution hazards;
c. Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
d. Prevent coastal flooding from inland projects.

Response: The project sites fall within the limits of Zone C, areas of minimal flooding. Drainage improvements will be designed in accordance with the Drainage Standards of the County of Maui to ensure that the project will not adversely affect downstream and adjoining properties from the effects of flooding and erosion.

7. ***Managing Development***

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies:

a. Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;
b. Facilitate timely processing of applications for development permits and resolve overlapping of conflicting permit requirements; and
c. Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process.

Response: This Environmental Assessment has been prepared for public review in compliance with Chapter 343, HRS, and Chapter 200 of Title 11, Administrative Rules, *Environmental Impact Statement Rules*.

In addition, all aspects of development will be conducted in accordance with applicable State and County requirements. Opportunity for review of the proposed action is offered through the various regulatory permit processes.

8. ***Public Participation***

Objective: Stimulate public awareness, education, and participation in coastal management.

Policies:

a. Promote public involvement in coastal zone management processes;

b. Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities; and

c. Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

Response: Opportunities for public awareness, education, and participation in coastal management are provided through the environmental review process.

9. ***Beach Protection***

Objective: Protect beaches for public use and recreation.

Policies:

a. Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion;

b. Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities; and

c. Minimize the construction of public erosion-protection structures seaward of the shoreline.

Response: At its closest point, the project sites are located approximately 4.0 miles from the shoreline and are not anticipated to impact shoreline processes.

10. ***Marine Resources***

Objective: Promote the protection, use, and development of marine and coastal resources to assure their sustainability.

Policies:

a. Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;
b. Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency;
c. Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;
d. Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and
e. Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

Response: Best Management Practices (BMP's) will be incorporated during construction to support the policies of effective management of marine resources.

It is noted that the project sites are not located within the boundaries of the County of Maui's Special Management Area.

Chapter V

Summary of Adverse Environmental Effects Which Cannot Be Avoided

V. SUMMARY OF ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

The proposed development will result in unavoidable construction-related impacts as described in Chapter III, Potential Impacts and Mitigation Measures.

Potential effects include noise-generated impacts occurring from site preparation and construction activities. In addition, there may be temporary air quality impacts associated with dust generated from construction activities, and exhaust discharged by construction equipment. It should be noted, however, that these impacts are expected to be minimized through the implementation of the appropriate mitigative measures identified in Chapter III.

The proposed action is not anticipated to create any significant, long-term adverse environmental effects.

Chapter VI

Alternatives to the Proposed Action

VI. ALTERNATIVES TO THE PROPOSED ACTION

A. NO ACTION ALTERNATIVE

As previously indicated, there are a total of 6,679 Native Hawaiians on the waiting list for homestead lands on Maui. Of this total, approximately 2,926 Native Hawaiians are on the waiting list for residential houselots. Pursuant to the HHCA, the "no action" alternative does not represent a responsible option toward addressing the entitlements and housing needs of Native Hawaiians.

Given the adequacy and cost of housing in Hawaii, and considering the very low, long-term lease rents associated with Hawaiian homestead lands, the proposed action will provide Native Hawaiians with the opportunity to become homeowners and consequently, narrow the gap created by the shortage of affordable housing units on Maui.

B. DEFERRED ACTION ALTERNATIVE

A "deferred action" alternative would have similar consequences as the "no action" alternative in that the land use objectives of the proposed project would be delayed and would not be immediately realized.

This alternative could result in potentially higher development costs due to increases in labor and material costs or as a result of changes to infrastructure or the existing physical or socio-economic environment (i.e., window of opportunity and opportunity costs). Based on the preceding, the "deferred action" alternative was not considered.

C. SITE PLAN ALTERNATIVES

During the project's site planning process, the DHHL's requirements for the proposed subdivisions were examined to ensure that spatial and functional criteria for the project were adequately addressed. The site

planning process involved an analysis of various criteria, including but not limited to:

1. Lot sizes, layout, and total number of lots;
2. Area, setback, and functional requirements;
3. Space needs and adjacencies;
4. Topographic and drainage conditions;
5. Infrastructure requirements;
6. Development costs; and
7. Potential impacts to the environment.

Through the project's site planning process, various subdivision site plans were formulated for consideration by the DHHL. As a result of this process, the project's original plans were modified based on a re-evaluation of the project's operational requirements. The modified plans for the proposed project represent the product of this site planning process.

Chapter VII

Irreversible and Irretrievable Commitments of Resources

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The development of the proposed project is anticipated to result in the irreversible and irretrievable commitment of land and fiscal resources. Other resource commitments include energy, labor, and material resources. Impacts relating to the use of these resources should be weighed against the expected positive socio-economic benefits to be derived from the project versus the *consequences of taking no action.*

In addition, the proposed action is not anticipated to require a substantial commitment of government services or facilities. In general, the proposed action is not anticipated to place significant additional requirements on police, fire, medical, and social services.

Chapter VIII

Findings and Conclusions

VIII. FINDINGS AND CONCLUSIONS

The "Significance Criteria", Section 12 of the Administrative Rules, Title 11, Chapter 200, "Environmental Impact Statement Rules", were reviewed and analyzed to determine whether the proposed project will have significant impacts to the environment. The following analysis is provided:

1. ***No Irrevocable Commitment to Loss or Destruction of any Natural or Cultural Resource Would Occur as a Result of the Proposed Project***

   The proposed action will not result in any adverse environmental impacts. There are no known, rare, threatened or endangered species of flora, fauna, avifauna or important habitats located within the project sites.

   Historical and cultural resources are not expected to be adversely impacted by the proposed action. Data recovery results for Site 2377 (terraces and walls) will be submitted to the State Historic Preservation Division for review and approval. Prior to ground-altering construction activities, and until Site 2377's data recovery is completed, a buffer zone and construction barrier fencing (if required) will be placed around the site. Upon completion of data recovery, a report documenting the findings of the work will be submitted to the SHPD for review and approval. As necessary, archaeological monitoring will be conducted during all ground-altering construction activities. Should archaeological features, cultural artifacts or human burials be located during construction activities, work in the area of the find shall be promptly halted and the find protected from further disturbance. The SHPD will be immediately contacted to determine the significance of the find and establish appropriate mitigative measures, if necessary.

2. ***The Proposed Action Would Not Curtail the Range of Beneficial Uses of the Environment***

The proposed action and the commitment of land resources would not curtail the range of beneficial uses of the environment.

3. ***The Proposed Action Does Not Conflict with the State's Long-term Environmental Policies or Goals or Guidelines as Expressed in Chapter 344, Hawaii Revised Statutes***

The State's Environmental Policy and Guidelines are set forth in Chapter 344, Hawaii Revised Statutes. The proposed action is in consonance with the policies and guidelines.

4. ***The Economic or Social Welfare of the Community or State Would Not be Substantially Affected***

The proposed action would have a direct beneficial effect on the local economy during construction. In the long term, the proposed project will support the local economy through the contribution of salaries, wages, and benefits, as well as through the purchases of goods and services from local merchants and service providers.

5. ***The Proposed Action Does Not Affect Public Health***

No impacts to the public's health and welfare are anticipated as a result of the proposed action.

6. ***No Substantial Secondary Impacts, Such as Population Changes or Effects on Public Facilities are Anticipated***

No significant population changes are anticipated as a result of the proposed action.

The proposed action is not expected to adversely impact existing water and wastewater systems and facilities. Best Management Practices (BMP's) and appropriate erosion control measures will be utilized during the construction period. Drainage system improvements will be

constructed in accordance with applicable regulatory design standards to ensure that surface runoff will not have an adverse effect on adjacent or downstream properties. The proposed action is not expected to significantly impact public services such as police, fire, and emergency medical operations. No adverse impacts to educational, recreational, and solid waste collection and disposal facilities and resources are anticipated.

7. ***No Substantial Degradation of Environmental Quality is Anticipated***

During the construction phase of the project, there will be short-term air quality and noise impacts as a result of the project. In the long term, effects upon air quality and ambient noise levels should be minimal. The proposed action is not anticipated to significantly affect the open space and scenic character of the area.

No substantial degradation of environmental quality resulting from the action is anticipated.

8. ***The Proposed Action Does Not Involve a Commitment to Larger Actions, Nor Would Cumulative Impacts Result in Considerable Effects on the Environment***

The proposed action does not involve a commitment to larger actions.

9. ***No Rare, Threatened or Endangered Species or Their Habitats Would be Adversely Affected by the Proposed Action***

There are no rare, threatened or endangered species of flora, fauna, avifauna or important habitats within the project sites.

10. ***Air Quality, Water Quality or Ambient Noise Levels Would Not be Detrimentally Affected by the Proposed Project***

Construction activities will result in short-term air quality and noise impacts. Dust control measures, such as regular watering and sprinkling,

will be implemented to minimize wind-blown emissions. Noise impacts will occur primarily from construction-related activities. It is anticipated that construction will be limited to daylight working hours. Water quality is not expected to be affected.

In the long term, the proposed action is not anticipated to have a significant impact on air and water quality or ambient noise levels.

11. ***The Proposed Project Would Not Affect Environmentally Sensitive Areas, Such as Flood Plains, Tsunami Zones, Erosion-prone Areas, Geologically Hazardous Lands, Estuaries, Fresh Waters or Coastal Waters***

The project sites are not located within and would not affect environmentally sensitive areas. The project sites are not subject to flooding or tsunami inundation. Soils of the project sites are not erosion-prone. There are no geologically hazardous lands, estuaries, or coastal waters within or adjacent to the project sites.

12. ***The Proposed Action Would Not Substantially Affect Scenic Vistas and Viewplanes Identified in County or State Plans or Studies***

The project sites are not identified as a scenic vista or viewplane. The proposed action will not affect scenic corridors and coastal scenic and open space resources.

13. ***The Proposed Action Would Not Require Substantial Energy Consumption***

The proposed action will involve the short-term commitment of fuel for equipment, vehicles, and machinery during construction activities. However, this use is not anticipated to result in a substantial consumption of energy resources. In the long term, the project will create an additional demand for electricity. However, this demand is not deemed substantial

or excessive within the context of the region's overall energy consumption.

Based on the foregoing findings, it is anticipated that the proposed action will not result in any significant impacts.

Chapter IX

List of Permits and Approvals

IX. LIST OF PERMITS AND APPROVALS

The following permits and approvals will be required prior to the implementation of the project.

Federal

1. Department of Army Permit pursuant to Section 404, Clean Water Act (as applicable)

State of Hawaii

1. Community Noise Permit (as applicable)
2. NPDES Permit
3. Section 401 Water Quality Certification (as applicable)

County of Maui

1. Construction Permits (e.g., grubbing, grading, electrical, plumbing)

Chapter X

Agencies and Organizations Consulted During The Preparation of the Draft Environmental Assessment; Letters Received and Responses to Substantive Comments

X. AGENCIES AND ORGANIZATIONS CONSULTED DURING THE PREPARATION OF THE DRAFT ENVIRONMENTAL ASSESSMENT; LETTERS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

The following agencies and organizations were consulted during the preparation of the Draft Environmental Assessment. Agency comments and responses to substantive comments are also included in this section.

1. Neal Fujiwara, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. George Young, P.E.
Chief, Regulatory Branch
U.S. Department of the Army
U.S. Army Engineer District, Hnl.
Attn: Operations Division
Bldg. T-1, Room 105
Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
Pacific Islands Manager
U. S. Fish and Wildlife Service
300 Ala Moana Blvd., Rm. 3-122, Box 50088
Honolulu, Hawaii 96813

4. Chiyome L. Fukino, M.D., Director
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

5. Peter T. Young, Director
State of Hawaii
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

6. P. Holly McEldowney, Acting Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

7. Fred Cajigal, Maui District Engineer
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

8. Clyde Namu'o, Deputy Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

9. Carl Kaupalolo, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, Hawaii 96732

10. Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 S. High Street
Wailuku, Hawaii 96793

11. Michael W. Foley, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

12. Glenn Correa, Director
County of Maui
Department of Parks and Recreation
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

13. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

14. Gilbert Coloma-Agaran, Director
County of Maui
Department of Public Works and Environmental Management
200 South High Street
Wailuku, Hawaii 96793

15. George Tengan, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

16. Honorable Charmaine Tavares
Councilmember
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

17. Ms. Elliott Krash
Kula Community Association
P.O. Box 417
Kula, Hawaii 96790

18. Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96793

19. Mr. Anthony "Tony" Sang Sr.
State Council of Hawaiian Homestead Associations
41-167 Nalu Street
Waimanalo, Hawaii 96795

20. Rev. Tasha Kama
State Council of Hawaiian Homestead Associations
CEO & Maui Ahupua'a President
P.O. Box 503
Wailuku, Hawaii 96793

21. Perry Artates, Chairman
Waiohuli Hawaiian Homesteaders, Inc.
95 Lono Avenue, Suite 104
Kahului, Hawaii 96732

22. Blossom Feiteira, President
Hui Kako'o Aina Ho'opulapula
P.O. Box 2963
Wailuku, Hawaii 96793

ALAN M. ARAKAWA
Mayor

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2 , Wailuku, Hawaii 96793

March 17, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI, TMK 2-2-02: POR. 56

We have reviewed the proposed action for the subject project and have no comments to offer at this time.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Planning and Development

COUNTY OF MAUI
DEPARTMENT OF PLANNING

March 17, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

RE: Preliminary Consultation on a Draft Environmental Assessment (DEA) for Proposed Hawaiian Homestead Land Subdivisions at Waiohuli (TMK: 2-2-002: 056, portion), Kula, Maui, Hawaii (LTR 2003/1046)

The Maui County Planning Department (Department) is in receipt of your letter dated March 6, 2003, soliciting comments for the above-referenced project in conjunction with the DEA pre-assessment consultation process. The Department has the following comments:

1. The Draft EA should address infrastructure and public service impacts on water, fire protection, sewage, energy, drainage, soil erosion and traffic;

2. The DEA should include detailed maps and plans of the subdivision

3. In addition, the DEA should identify rare, endangered, or threatened plants and wildlife located in the project site and methods used to mitigate impacts to these communities.

Thank you for the opportunity to comment. If additional clarification is required, please contact Ms. Maria N. Isotov, Staff Planner, of this office at 270-7735.

Sincerely,

M. Le Foley

Michael W. Foley
Planning Director

MWF:MNI:lar
c: Wayne Boteilho, Deputy Director of Planning
Clayton I. Yoshida, AICP, Planning Program Administrator
Maria N. Isotov, Staff Planner
General File
TMK File
K:\WP_DOCS\PLANNING\EA\2003\EA_DHHL_WaihuliSubd\EAPrecon.wpd

MUNEKIYO HIRAGA, INC.

March 25, 2003

Michael W. Foley, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02: por. 56

Dear Mr. Foley:

Thank you for providing us with your early consultation comments on the above-referenced project. On behalf of the State of Hawaii, Department of Hawaiian Home Lands, we would like to note the following.

1. Information on public services and infrastructure will be included in the Draft Environmental Assessment (DEA).

2. Detailed subdivision plans will be included in the DEA.

3. The DEA will examine plant and wildlife in the project area and identify any rare, threatened or endangered plants and wildlife, as well as appropriate mitigative measures.

Please feel free to call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:tn
cc: William Makanui III, Department of Hawaiian Home Lands
Paul Arita, Austin, Tsutsumi & Associates, Inc.
sta/kula2/planning.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 · fax: (808)244-8729 planning@mhinconline.com

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

MAR 25 2003

MAYOR ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

March 21, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI, TMK 2-2-02:POR.56

Thank you for your March 6, 2003 letter and enclosures regarding the subject subdivisions.

We fully support the subdivisions proposed by the Department of Hawaiian Home Lands as it will provide 112 much needed affordable houselots.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

c: Housing Administrator

Alan M. Arakawa
MAYOR

OUR REFERENCE
YOUR REFERENCE ti

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

March 19, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02: por.56

Thank you for your letter of March 6, 2003, requesting comments on the above subject.

The summary was reviewed and we have no additional comments or recommendations at this time. Thank you for giving us the opportunity to comment on this project. We are returning the summary which was submitted for our review.

Very truly yours,

Assistant Chief Sydney Kikuchi
for: Thomas M. Phillips
Chief of Police

Enclosure

c: Michael Foley, Planning Department

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96733-6898 • (808) 871-8461

March 31, 2003

Mr. Glenn Tadaki
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Tadaki:

Subject: Proposed Hawaiian Homestead Land Subdivision at Waiohuli, EA
(TMK: 2-2-02: por.56, Kula)

Thank you for allowing us to comment on the subject project.

In reviewing the information transmitted and our records, Maui Electric Company (MECO) at this time has no objections to the proposed project.

MECO encourages the project's consultant meet with us as soon as practical so that we may discuss the electrical requirements (eg. easements, line extensions, system improvements, etc.) of this project.

If you have any questions or concerns, please call Fred Oshiro at 872-3202.

Sincerely,

Neal Shinyama
Manager, Energy Delivery

NS/FO:lkh

ALAN M. ARAKAWA
Mayor

GILBERT S. COLOMA-AGARAN
Director

MILTON M. ARAKAWA, A.I.C.P
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

JOHN D. HARDER
Solid Waste Division

March 31, 2003

Mr. Glenn Tadaki, Planner
MUNEKIYO & HIRAGA, INC.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: EARLY CONSULTATION
DEPARTMENT OF HAWAIIAN HOMELANDS
SUBDIVISIONS AT WAIOHULI
TMK: (2) 2-2-002:056 (Portion)

We reviewed the request for early consultation for the subject subdivisions and have the following comments:

1. Street signs and striping shall meet County standards. Striping shall be of thermoplastic extrusion (alkyd) material.

2. Information on maintenance of drainage improvements, street lighting, guardrails and other road appurtenances shall be included in the Environmental Assessment (EA).

3. All roadways should be constructed in accordance with County standards. No utility easements outside the road right-of-way should be dedicated or maintained by the County.

4. The grading for the project shall comply with the provisions of the grading ordinance. Best Management Practices (BMPs) shall be implemented to the maximum extent practicable to prevent pollutants including dust and sediment from discharging off the project site. Dust during the construction of the Kula Residential

Lot, Unit 1 Subdivision was a problem for property owners mauka of the subdivision. There shall be an adequate supply of water made available for dust control during construction of the proposed subdivisions and a comprehensive BMP plan shall be submitted for approval.

5. The drainage system design shall comply with the provisions of the drainage rules and shall create no additional adverse effects to adjacent and downstream properties.

6. The subdivisions shall comply with the provisions of Title 18, Maui County Code, the subdivision ordinance.

If you have any questions regarding this letter, please call Milton Arakawa at 270-7845.

Sincerely,

for GILBERT S. COLOMA-AGARAN
Director

RMN:msc
S:\LUCA\CZM\dhhl_waiohuli(112lot)-ec_22002056.msc03.wpd

MUNEKIYO & HIRAGA, INC.

April 11, 2003

Gilbert Coloma-Agaran, Director
Department of Public Works
and Environmental Management
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02:por. 56

Dear Mr. Coloma-Agaran:

Thank you for providing us with your early consultation comments on the above-referenced project. On behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), we would like to note the following.

1. Street signs and striping for the subdivisions will be in accordance with County standards.
2. Information about the maintenance of the subdivision's drainage systems, as well as street lights, guardrails, and other roadway-related structures will be included in the Environmental Assessment (EA).
3. Subdivision roadways will be constructed in accordance with County standards. Utility easements beyond the roadway rights-of-way will be maintained and under the control of the DHHL.
4. Grading for the subdivisions will be conducted in accordance with County standards and Best Management Practices will be implemented to control erosion, surface runoff, and fugitive dust. The contractor will also be required to maintain an adequate supply of water for the implementation of dust control measures during and after normal working hours.
5. Drainage systems for the subdivisions will be designed in accordance with County standards to create no adverse effects to adjacent and downstream properties.
6. With the exception of the attached exemptions declared by the DHHL pursuant to the Hawaiian Homes Commission Act of 1920 (as amended), the subdivisions will comply with the provisions of the County subdivision ordinance.

planning environment

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

Please feel free to call me should you have any questions.

Very truly yours,

Glenn Tadaki, Planner

GT:tn
Attachments
cc: William Makanui III, Department of Hawaiian Home Lands (w/out attachments)
Paul Arita, Austin, Tsutsumi & Associates, Inc. (w/out attachments)
sta/kula2/dpwem.res

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

December 20, 2002

The Honorable David C. Goode
Department of Public Works and Waste Management
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Goode:

Subject: Waiohuli Lot 134 Subdivision: Proposed Subdivision
of Parcel 134 of File Plan 2321
Tax Map Key: (2) 2-2-02: Por. 56
Waiohuli, Kula, Makawao, Maui, Hawaii

This letter authorizes Austin, Tsutsumi and Associates, Inc. to act as the agent on behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), in the processing of the subject parcels for preliminary and final subdivision approval.

DHHL is developing this subdivision under the Hawaiian Homes Commission Act, 1920, as amended (Act). As allowed by the Act, DHHL is exempting itself from various State of Hawaii and County of Maui subdivision development-related statutes and regulations for the Waiohuli Lot 134 Subdivision.

The declaration of exemptions below is intended to facilitate the granting of final subdivision approval upon completion of the subdivision improvements and to minimize the cost of the improvements.

These exemptions will not substantially endanger human health or safety and are in the public's interest. Compliance with those sections of the Maui County Code, that this project is being exempted, from would produce serious hardship without equal or greater benefit to the lessees or the public.

Exemptions from the following State of Hawaii and County of Maui subdivision statutes and regulations are being declared:

1. State Land Use Commission District Boundary Amendment
   - Chapter 205, Hawaii Revised Statutes, as Amended
   - State Land Use Commission Rules.

2. Title 19, Maui County Code, 1980, as Amended
   - Chapter 19.510 Application and Procedures
   - Section 19.510.040 Change of Zoning.

3. Community Plan Amendment
   - Maui County Code, Chapter 2.80
   - Maui County Charter, Section 8-8.4 and 8-8.5.

4. Tax Clearance
   - Maui County Code 18.12.040, Submittal of a tax clearance certificate by the subdivider.

5. Maui County Code Section 18.12.060
   - Filing for extensions from the time of tentative subdivision approval to completion of the improvements and final subdivision approval.

6. Subdivision Filing Fees
   - Maui County Code 18.24.010, Filing Fees for subdivision and plan review.

7. Subdivision Design Standards
   - Maui County Code 18.20.140, Underground utilities. Electric power lines will be installed overhead instead.

8. Subdivision Design Standards
   - Maui County Code 18.16.130. This project will be exempt from the requirement that cul-de-sacs measure not more than five hundred feet
   - Section 19.04.040, Minimum distance between flag lots. Flag lots for this project shall be permitted to be back-to-back.

9. Section 12.24A.070. This project will be exempt from the requirements of street tree planting.

The subdivision is situated on lands zoned AG Zone 1 (County of Maui, Maui County Code Section 19.30A). However, the subdivision shall be designed and reviewed in accordance with Rural standards of the Maui County Code, Section 19.29.020. Minimum lot areas shall be 0.5 acre.

Should you have any questions, please call Gerald Lee of our Land Development Division at 587-6447 or I can be reached at 586-3801.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: County of Maui, Land Use and Codes Administration
Austin, Tsutsumi & Associates, Inc.

APR

LINDA LINGLE
GOVERNOR

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DAN DAVIDSON
DEPUTY DIRECTOR FOR LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

P.O. Box 621
HONOLULU, HAWAII 96809

March 31, 2003

L-1451/1180/1462/1402/1429

LD-NAV
DHHLWAIOHULISUB.RCM

Munekiyo and Hiraga, Inc.
Glenn Tadaki, Planner
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

SUBJECT: Early Consultation for Preparation of a DEA
Project: DHHL Residential Subdivisions at Waiohuli, Maui
TMK: 2nd/ 2-2-002: Portion of 056

Thank you for the opportunity to review and comment on the subject matter.

The Department of Land and Natural Resources' (DLNR) Land Division distributed a copy of your letter (Project Summary and Site Maps) dated March 6, 2003 to the following DLNR Divisions for their review and comment:

- Division of Aquatic Resources
- Division of Forestry & Wildlife
- Division of State Parks
- Commission on Water Resource Management
- Engineering Division
- Land-Planning and Technical Services
- Land-Maui District Land Office

Attached herewith is a copy of the Engineering Division comment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer at this time.

If you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at (808) 587-0384.

Very truly yours,

Charlene E. Unoki

for DIERDRE S. MAMIYA
Administrator

C: MDLO

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RECEIVED
DIVISION OF
D MANAGEMENT
MAR 17 PM 3:49

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

ERNEST LAU
DEPUTY DIRECTOR

DEAN A. NAKANO
ACTING DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. Box 621
HONOLULU, HAWAII 96809

March 13, 2003

LD/NAV L-1160
Ref.: DHHLWAIOHULISUB.CMT

Suspense Date: 3/25/03

MEMORANDUM:

TO: XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Engineering Division
XXX Division of State Parks
Division of Boating and Ocean Recreation
XXX Commission on Water Resource Management
XXX Land-Planning and Technical Services
✓XXX Land-Maui District Land Office

FROM: Charlene E. Unoki: Acting Assistant Administrator
Land Division

SUBJECT: Early Consultation for Preparation of a Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Proposed: Establish Three (3) Residential Subdivisions
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-9729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the attached letter dated March 6, 2003 (summary) and location map covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

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

Date: 3-25-03

Signed: Jason K. Koga

Name: Jason K. Koga

LINDA LINGLE
GOVERNOR

DIVISION OF AQUATIC RESOURCES

DIRECTOR	✓	Suspense Date:
COASTAL FISHERIES		Draft Reply ☐
AQUACULTURE		Reply Direct ☐
AQUATIC ED	✓	Comments ☐
STATE SVCS		Information ☐
FI DEV		Comp Act & File ☐
STATISTICS		Return to:
AFRC		Copies to:
ADMIN		Remarks:
	1	03-19-03
P.C.	✓	

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. Box 621
HONOLULU, HAWAII 96809

CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

ERNEST LAU
DEPUTY DIRECTOR

DEAN A. NAKANO
ACTING DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

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

March 13, 2003

LD/NAV L-1180
Ref.: DHHLWAIOHULISUB.CMT

Suspense Date: 3/25/03

MEMORANDUM:

TO: ✓XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Engineering Division
XXX Division of State Parks
Division of Boating and Ocean Recreation
XXX Commission on Water Resource Management
XXX Land-Planning and Technical Services
XXX Land-Maui District Land Office

RECEIVED
MAR 13 2003
AQUATIC RESOURCES

FROM: Charlene E. Unoki: Acting Assistant Administrator
Land Division

SUBJECT: Early Consultation for Preparation of a Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Proposed: Establish Three (3) Residential Subdivisions
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the attached letter dated March 6, 2003 (summary) and location map covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

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

Date: 3/20/03 Signed: [signature]

Name: 3-20-03

LINDA LINGLE
GOVERNOR

— DIV BR
— LAN BR
— RES MGT BR
— CLERICAL
— ADMIN ASST
— INTERP BR

— CIRC/POST/STAFF RM
— COMMENTS & REC
— DRAFT REPLY
— FILE
— FOLLOW UP
— INFO
— RUN COPIES_____
— RUSH DUE_____
— SEE ME
— FAX/SEND COPY TO___

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. Box 621
HONOLULU, HAWAII 96809

March 13, 2003

...OF LAND AND NATURAL RESOURCES

ERNEST LAU
DEPUTY DIRECTOR

DEAN A. NAKANO
ACTING DEPUTY DIRECTOR FOR
THE COMMISSION ON WATER
RESOURCE MANAGEMENT

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
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HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

LD/NAV L-1180
Ref.: DHHLWAIOHULISUB.CMT

Suspense Date: 3/25/03

MEMORANDUM:

TO: XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Engineering Division
✓XXX Division of State Parks
Division of Boating and Ocean Recreation
XXX Commission on Water Resource Management
XXX Land-Planning and Technical Services
XXX Land-Maui District Land Office

FROM: Charlene E. Unoki: Acting Assistant Administrator
Land Division

SUBJECT: Early Consultation for Preparation of a Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Proposed: Establish Three (3) Residential Subdivisions
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the attached letter dated March 6, 2003 (summary) and location map covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

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

Date: 3/24/03

Signed: [signature]

Name: Daniel S. Quinn

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. Box 621
HONOLULU, HAWAII 96809

March 13, 2003

LD/NAV L-1180
Ref.: DHHLWAIOHULISUB.CMT

Suspense Date: 3/25/03

MEMORANDUM:

TO: XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
✓XXX Engineering Division
XXX Division of State Parks
Division of Boating and Ocean Recreation
XXX Commission on Water Resource Management
XXX Land-Planning and Technical Services
XXX Land-Maui District Land Office

FROM: Charlene E. Unoki: Acting Assistant Administrator
Land Division

SUBJECT: Early Consultation for Preparation of a Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Proposed: Establish Three (3) Residential Subdivisions
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the attached letter dated March 6, 2003 (summary) and location map covering the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.

(X) Comments attached.

Date: _____

Signed: _____

Name: _____

DEPARTMENT OF LAND AND NATURAL RESOURCES
Engineering Division

COMMENTS

For your information, the proposed project site, according to FEMA Community-Panel No. 150003 0270 B, is located within Zone C. Zone C is an area of minimal flooding.

Please note that the National Flood Insurance Program does not have any specific regulations for development within Zone C.

Please include the water demand for the proposed project in the Draft Environmental Assessment, and provide the water demand and calculations to the Engineering Division. The Department of Land and Natural Resources prepares and updates a Statewide Water Projects Plan, and will include the water demands in its next update.

Should you have any questions, please call Mr. Andrew Monden of the Planning Branch at 587-0227.

Signed: Eric T. Hirano
ERIC HIRANO, CHIEF ENGINEER

Date: 3/24/03

N:\WLD\MAKAI\DENNIS\WORD\Waiohuli_ProposDHHLsubdiv_PreConsultLtr_com_M3.doc

MUNEKIYO HIRAGA, INC.

April 8, 2003

Dierdre Mamiya, Administrator
Department of Land and
Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

SUBJECT: Proposed Hawaiian Homestead Land Subdivision at Waiohuli
TMK 2-2-02:por. 56

Dear Ms. Mamiya:

Thank you for providing us with your department's early consultation comments on the above-referenced project.

On behalf of the State of Hawaii, Department of Hawaiian Home Lands, and in response to the Engineering Division's comments, we would like to note that water use estimates for the subdivisions will be included in the Draft Environmental Assessment.

Please feel free to call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:tn
cc: William Makanui III, Department of Hawaiian Home Lands
Paul Arita, Austin, Tsutsumi & Associates, Inc.
ata/kuta2/dlnr.res

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

planning environment

APR 14 2003

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 270-7816 • Fax (808) 270-7833

April 7, 2003

Mr. Glenn Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku HI 96793

Dear Mr. Tadaki:

SUBJECT: Proposed Hawaiian Homestead Land Subdivision at Waiohuli - establishment of 3 residential subdivisions which will provide for 112 homesites
TMK (2) 2-2-002:056 por

Thank you for the opportunity to comment on this project proposal.

According to the Memorandum of Understanding and Water Credits Agreement entered into by the applicant and DWS in December, 1997, DWS will commit 500,000 gpd of potable water to DHHL for the DHHL homesites (TMK 2-2-002:055 & 2-2-002:056 por). We understand that DHHL estimates cumulative consumption for the DHHL Homesites Project would be 305,100 gpd including 45,000 gpd for Keokea Farm Lots which is currently pending. The EA should identify sources and expected water consumption for current and cumulative phases of the project. Based on system standard guidelines, anticipated usage would be 67,200 gpd.

An 18-inch waterline traverses the project area. The applicant will be required to comply with DWS Rules and Regulations for Subdivisions as well as provide domestic, fire, and irrigation services in accordance with standards. Fire, domestic and irrigation calculations prepared, signed and stamped by a certified architect or engineer will be required during the building permit process. The approved fire flow calculation methods for use include Guidance for Determination of Fire Flow- Insurance Service Office, 1974 and Fire Flow- Hawaii Insurance Bureau, 1991.

We encourage the applicant to consider the following water conservation measures and integrate the same in the project design and construction as well as convey information to future homeowners, where applicable:

Use brackish and/or reclaimed water sources for dust control during construction, if such alternative is available.

Eliminate Single-Pass Cooling: Single-pass, water-cooled systems should be eliminated per Maui County Code Subsection 14.21.20. Although prohibited by code, single-pass water cooling is still manufactured into some models of air conditioners, freezers, and commercial refrigerators.

Utilize Low-Flow Fixtures and Devices: Maui County Code Subsection 16.20A.680 requires the use of low-flow water fixtures and devices in faucets, showerheads, urinals, water closets, and hose bibs. Water conserving washing machines, ice-makers and other units are also available.

Maintain Fixtures to Prevent Leaks: A simple, regular program of repair and maintenance can prevent the loss of hundreds or even thousands of gallons a day. Refer to the attached handout, "The Costly Drip".

Use Climate -adapted Plants: The project is located in the Maui County Planting Plan - Plant Zones 2 & 4. We encourage the applicant to utilize appropriate native and non invasive species and avoid the use of potentially invasive plants. Native plants adapted to the area, conserve water and protect the watershed from degradation due to invasive alien species. Attached is a list of appropriate plants for the zones as well as potentially invasive plants to avoid.

Limit Irrigated Turf: Limit irrigated turf by 25% or less of total landscaped area. Select turf species with low water use requirements. Low-water use shrubs and ground covers can be equally attractive and require substantially less water than turf.

Look for Opportunities to Conserve Water: A few examples of these are as follows: When clearing driveways, etc. of debris, use a broom instead of a hose. When washing cars, use a hand-operated spray nozzle instead of an open hose. Additionally, check for leaks in faucets and toilet tanks.

The project overlies the Kamaole aquifer which has a sustainable yield of 11 MGD. The project site is located within a key recharge area for the Haiku, Hamakuapoko and Kaupakalua wells and is vulnerable to contamination from many types of land uses and activities, including improper handling and disposal of household hazardous materials, septic systems, and improper use of pesticides and nutrients in yards and gardens. The Safe Drinking Branch of the Department of Health states that this underlying aquifer is considered an underground source of drinking water and that one of the conditions set for granting of variance renewal request by DOH is to educate residents on the prevention of groundwater contamination. We recommend that future homeowners be provided attached information materials. In addition, we recommend that the applicant adopt Best Management Practices (BMPs) designed to minimize infiltration and runoff from construction and vehicle operations. We have attached sample BMPs for principle operations for reference.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan
Director

eam
c: engineering division
applicant, with attachments
Maui County Planting Plan-Plant Zone 2 & 4-Saving Water in the Yard- What and How to Plant in your Area
The Costly Drip
A Checklist of Water Conservation Ideas for Home and Yard
Ordinance 2108- A Bill for an Ordinance Amending Chapter 16.20 of the Maui County Code, Pertaining to the Plumbing Code
How Homeowners Can Help Prevent Groundwater Pollution
Suggested Practices - Prevention of Groundwater Contamination from Septic System- Citizen's Guide to Groundwater Protection- EPA
Selected BMP's from "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters"-EPA

MUNEKIYO & HIRAGA, INC.

April 23, 2003

George Y. Tengan, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02: por. 56

Dear Mr. Tengan:

Thank you for providing us with your early consultation comments on the above-referenced project. On behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), we would like to note the following.

1. Information on water source and estimated use will be included in the Environmental Assessment (EA).
2. The water systems for the proposed project will be designed in accordance with the Department of Water Supply's (DWS) standards for subdivisions. Water for potable, fire flow, and irrigation uses will be coordinated with the DWS. The proposed project involves the creation of residential house lots for Hawaiian homestead land lessees; building permits for home construction will be the responsibility of homestead land lessees.
3. A copy of your letter was furnished to the project's civil engineer. Appropriate water conservation measures will be incorporated in the project's design and construction and information on water conservation measures will be provided to homestead land lessees.
4. The contractor will be required to implement Best Management Practices (BMPs) to minimize runoff from construction activities and vehicle operations. A copy of your letter and the attached BMPs were furnished to the project's civil engineer. Information on BMPs will also be provided to homestead land lessees.

planning environment

305 High Street, Suite 104 · Wailuku, Hawaii 96793 · ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

Please feel free to call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:tn
cc: William Makanui III, Department of Hawaiian Home Lands
Paul Arita, Austin, Tsutsumi & Associates, Inc.
ata/kula2/dws.res

PHONE (808) 594-1888

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

FAX (808) 594-1865

HRD03/477

April 15, 2003

Glenn Tadaki
Planner
Munekiyo & Hiraga, Inc.
305 High Street, Ste 104
Wailuku, HI 96793

Re: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli, TMK 2-2-02:por 56

Dear Mr. Tadaki,

OHA is in receipt of your March 6, 2003 request for comments on the above referenced proposal. We apologize for our late response.

OHA asks that DHHL address proposed water use for these projects. The DHHL should do a water plan for the area, and the plan should be included in the EA.

Thank you for the opportunity for early consultation on this project. If you have further questions please contact Pua Aiu at 594-1931.

Sincerely,

Peter L. Yee
Director
Nationhood and Native Rights

MUNEKIYO HIRAGA, INC.

April 25, 2003

Peter L. Lee, Director
Nationhood and Native Rights
Office of Hawaiian Affairs
State of Hawaii
711 Kapi'olani Boulevard, Suite 500
Honolulu, Hawaii 96813

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02: por. 56

Dear Mr. Lee:

Thank you for providing us with your early consultation comments on the above-referenced project. On behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), we would like to note that information on water use and system improvements will be included in the Environmental Assessment (EA).

Please feel free to call me should you have any questions.

Sincerely,

Glenn Tadaki, Planner

GT:tn
cc: William Makanui III, Department of Hawaiian Home Lands (w/out attachments)
Paul Arita, Austin, Tsutsumi & Associates, Inc. (w/out attachments)
pta/kula2/oha.res

305 High Street, Suite 104 Wailuku, Hawaii 96793 ph: (808)244-2015 · fax: (808)244-8729 · planning@mhinconline.com

JUN 2 7 2003

Waiohuli Hawaiian Homesteaders Association, Inc.
95 Lono Avenue, Suite 104
Kahului, Maui, Hawaii 96732

May 31, 2003

Glen Tadaki, Planner
Munekiya & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli
TMK 2-2-02: por. 56

Aloha Mr. Tadaki,

Thru our various verbal discussions and site visits in Waiohuli, it gives the Waiohuli Hawaiian Homesteaders Association Inc. great trust and assurance that the mission of our Prince Jonah Kuhio is working by the expertise that you have to offer as the consultant & planner for the future phases; Waiohuli Uka Subdivision & Waiohuli Hina Subdivision.

We *will* work very closely with you and among other parties involved with this Proposed Hawaiian Homestead Land Subdivisions at Waiohuli. It is a pleasure meeting you and it will continue through our business and friendship.

Please feel free to call me at anytime of the day @ 871-0909 or my cell @ 357-0831. Also my e-mail address is hoeisf2@aol.com

I am,

Perry O. Artates
Chairman
Waiohuli Hawaiian Homesteaders Association, Inc

Cc: William Makanui III, Department of Hawaiian Homelands
Paul Arita, Austin Tsutsumi & Associates

JUN 2 4 2003

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

June 20, 2003

Regulatory Branch

Mr. Glen Tadaki, Planner
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Tadaki:

This letter responds to your request for comments on the Waiohuli Uka Subdivision project, dated June 18, 2003. Based on the information you provided and a site visit by a member of my staff, I have determined that there are no waters of the U.S., including wetlands, on the project site which would be affected by the project, therefore a Department of the Army (DA) permit will not be required for this project. If the project plans change so that other potential waters of the U.S. may become involved, please contact this office to determine permit requirements. Please place us on the mailing list for the draft and final environmental documents.

If you have any questions concerning this matter, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200300466.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Chapter XI

Agencies Contacted During the Draft Environmental Comment Period, Comments Received and Responses to Substantive Comments

XI. AGENCIES CONTACTED DURING THE DRAFT ENVIRONMENTAL ASSESSMENT COMMENT PERIOD, COMMENTS RECEIVED AND RESPONSES TO SUBSTANTIVE COMMENTS

Agencies and individuals listed in this chapter were sent a copy of the Draft Environmental Assessment. Letters received during the 30-day comment period and responses to substantive comments are included in this section.

1. Ranae Ganske-Cerizo, Soil Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
210 Imi Kala Street, Suite 209
Wailuku, Hawaii 96793-2100

2. William Lennan
Department of the Army
U.S. Army Engineer District, Hnl.
Attn: Operations Division
Bldg. T-1, Room 105
Fort Shafter, Hawaii 96858-5440

3. Robert P. Smith
Pacific Islands Manager
U. S. Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

4. Chiyome L. Fukino, M.D., Director
State of Hawaii
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

5. Herbert Matsubayashi
District Environmental Health Program Chief
State of Hawaii
Department of Health
54 High Street
Wailuku, Hawaii 96793

6. Peter Young, Chairperson
State of Hawaii
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

7. Holly McEldowney, Acting Administrator
State of Hawaii
Department of Land and Natural Resources
State Historic Preservation Division
601 Kamokila Blvd., Room 555
Kapolei, Hawaii 96707

8. Fred Cajigal, Maui District Engineer
State of Hawaii
Department of Transportation
Highways Division
650 Palapala Drive
Kahului, Hawaii 96732

9. Clyde Namu'o, Deputy Administrator
Office of Hawaiian Affairs
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

10. Carl Kaupalolo, Chief
County of Maui
Department of Fire Control
200 Dairy Road
Kahului, Hawaii 96732

11. Alice Lee, Director
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawaii 96793

12. Michael Foley, Director
County of Maui
Department of Planning
250 South High Street
Wailuku, Hawaii 96793

13. Glenn Correa, Director
County of Maui
Department of Parks and Recreation
1580 C. Kaahumanu Avenue
Wailuku, Hawaii 96793

14. Tom Phillips, Chief
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

15. Gilbert Coloma-Agaran, Director
County of Maui
Department of Public Works and Environmental Management
200 South High Street
Wailuku, Hawaii 96793

16. George Tengan, Director
County of Maui
Department of Water Supply
200 South High Street
Wailuku, Hawaii 96793

17. Honorable Charmaine Tavares
Councilmember
Maui County Council
200 South High Street
Wailuku, Hawaii 96793

18. Ms. Elliott Krash
Kula Community Association
P.O. Box 417
Kula, Hawaii 96790

19. Maui Electric Company, Ltd.
P.O. Box 398
Kahului, Hawaii 96732

20. Mr. Anthony "Tony" Sang Sr.
State Council of Hawaiian Homestead Associations
41-167 Nalu Street
Waimanalo, Hawaii 96795

21. Rev. Tasha Kama
State Council of Hawaiian Homestead Associations
CEO & Maui Ahupua'a President
P.O. Box 503
Wailuku, Hawaii 96793

22. Perry Artates, Chairman
Waiohuli Hawaiian Homesteaders, Inc.
95 Lono Avenue, Suite 104
Kahului, Hawaii 96732

23. Blossom Feiteira, President
Hui Kako'o Aina Ho'opulapula
P.O. Box 2963
Wailuku, Hawaii 96793

AUG 18 2004

United States Department of Agriculture

NRCS Natural Resources Conservation Service

USDA

Our People...Our Islands...In Harmony

210 Imi Kala Street, Suite #209, Wailuku, HI 96793-2100

August 16, 2004

Mich Hirano
Munekiyo & Hiraga
305 High Street, Suite 104
Wailuku, Hawaii 96793

Subject: Proposed Hawaiian Land Subdivisions at Waiohuli-Draft Assessment
TMK: (2) 2-2-02:por. 56

Dear Mr. Hirano,

We highly recommend any construction activities minimize disturbance to wildlife habitat including habitat for threatened and endangered species.

Diversion ditches and swales should be seeded as soon as practicable after construction. We recommend grass species, planting time and method, and fertilizer application rates be shown on plans to reduce potential erosion problems. Construction operations should be avoided in the winter months to reduce erosion.

Thank you for the opportunity to comment.

Sincerely,

Ranae Ganske–Cerizo
Acting District Conservationist

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Ms. Ranae Ganske-Cerizo, Acting District Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
210 Imi Kala Street, Suite # 209
Wailuku, Hawaii 96793-2100

Dear Ms. Ganske-Cerizo:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli,
Maui, TMK 2-2-02:por. 56

Thank you for your letter dated August 16, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

DHHL confirms construction activities will be carried out with an intention to minimize disturbances to wildlife habitat, including habitat for threatened and endangered species. DHHL will advise awardees regarding the existence of native birds in the region and the need for protection of their habitats.

The diversion ditches and swales will be seeded as soon as practicable after construction. Best management practices (BMPs) will be employed during grading and construction of improvements to minimize impacts to adjacent and downstream properties.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

AUG 17 2004

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

August 13, 2004

Regulatory Branch

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

This letter responds to your request for comments on the draft Environmental Assessment (DEA) for the proposed Hawaiian Homestead Land Subdivisions at Waiohuli, dated July 2004. Based on the information you provided and a site visit by a member of my staff, I have determined that there are waters of the U.S. on the project site; however, there is not enough detail in the DEA to determine if they would be affected by the project. When more details are available concerning the project please contact this office to determine permit requirements. Please place us on the mailing list for the final environmental documents.

If you have any questions concerning this matter, please contact William Lennan of my staff at 438-6986 or FAX 438-4060, and reference File No. 200300466.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Mr. George P. Young, P.E., Chief
Regulatory Branch
U.S. Department of Army
Corps of Engineers
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter dated August 13, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

The determination "there are waters of the U.S. on the project site" provided in the August 13, 2004 letter is contrary to the determination "there are no waters of the U.S. on the project site, including wetlands" contained in your earlier comment letter dated June 20, 2003 provided during the early consultation process. In this regard, we have been in contact with Laurene Silva of your department to clarify whether a Department of Army Permit will be required for the proposed action. Further coordination will be carried out with the Department of Army to review detailed development plans to determine permitting requirements. We confirm that the Department of Hawaiian Home Lands will comply with all Department of Army permitting requirements, should it be determined that there are waters of the U.S. on the project site that will be affected by the proposed project.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

LINDA LINGLE
GOVERNOR OF HAWAII

SEP 0 9 2004

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 / CWB

09010PKP.04

September 2, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

Subject: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli - Draft Environmental Assessment

The Department of Health (DOH), Clean Water Branch (CWB), has reviewed the subject application and offers the following comments:

1. The Army Corps of Engineers should be contacted at (808) 438-9258 to identify whether a Federal license or permit (including a Department of Army permit) is required for this project. Pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act"), a Section 401 Water Quality Certification is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...."

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following activities:

   a. Storm water associated with industrial activities, as defined in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi).

   b. 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 commencement of the construction activities.**

   c. Discharges of treated effluent from leaking underground storage tank remedial activities.

   d. Discharges of once through cooling water less than one (1) million gallons per day.

   e. Discharges of hydrotesting water.

   f. Discharges of construction dewatering effluent.

g. Discharges of treated effluent from petroleum bulk stations and terminals.

h. Discharges of treated effluent from well drilling activities.

i. Discharges of treated effluent from recycled water distribution systems.

j. Discharges of storm water from a small municipal separate storm sewer system.

k. Discharges of circulation water from decorative ponds or tanks.

The CWB requires that a Notice of Intent (NOI) to be covered by an NPDES general permit for any of the above activities be submitted at least 30 days before the commencement of the respective 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/index.html

3. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters and/or coverage of the discharge(s) under the NPDES general permit(s) is not permissible (i.e. NPDES general permits do not cover discharges into Class 1 or Class AA State waters). An application for the NPDES permit is to be submitted at least 180 days before the commencement of the respective activities. The NPDES application forms may also be picked up at our office or downloaded from our website at:
http://www.hawaii.gov/health/environmental/water/cleanwater/index.html

4. Hawaii Administrative Rules, Section 11-55-38, also requires the applicant to either submit a copy of the new 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 DOH that the project, activity, or site covered by the NOI or application has been or is being reviewed by SHPD.

If you have any questions, please contact Ms. Kris Poentis of the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

DENIS R. LAU, P.E., CHIEF
Clean Water Branch

KP:bt

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

TO: Dennis R. Lau, P.E., Chief Clean Water Branch
Department of Health

FROM: Micah Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for your letter dated September 2, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

Response to Comments on Department of Army Permit

Coordination will be carried out with the Department of Army regarding requirements for permitting when more detailed development plans for the project are completed.

Response to Comments on National Pollutant Discharge Elimination System Permit

DHHL acknowledges the requirements of the National Pollutant Discharge Elimination System (NPDES) and will comply with permit requirements as applicable.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

LINDA LINGLE
GOVERNOR OF HAWAII

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

SEP 10 2004

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

In reply, please refer to:
EMD / WB

September 7, 2004

M2 2 002 056.wpd
w11 wb040771

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 014
Wailuku, Maui, Hawaii 96793

Dear Mr. Hirano:

Subject: **Proposed Hawaiian Homestead Land Subdivisions at Waiohuli - Draft Environmental Assessment**
TMK: (2) 2 - 2 - 002: 056

We have reviewed the subject document which proposes to create three (3) residential subdivisions on Hawaiian homestead lands at Waiohuli in Kula, Maui, Hawaii. The proposed action addresses the need for improved houselots for residential construction and occupancy by Hawaiian homestead land lessees.

We have the following comments to offer. We have determined that an Application for Variance was filed and granted by the Department of Health on July 18, 2002 for the Kula Residence Lots Unit 1, Waiohuli, Kula, Maui, Hawaii (Variance Application No. WW 112 R / Docket No. 01-VWW-05). We recommend connection to the County sewer service system for all dwellings/lot when it becomes available. However, as that may not be reasonable at this time, we will allow the construction and use of treatment individual wastewater systems which must comply with the wastewater rules in effect at the time the lessee applies for a building permit.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at direct toll free no. 984-2400, extension 64294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

c: June Harrigan-Lum, EPO

Attachment: Variance Application No. WW 112R, Docket No. 01-VWW-05

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879

HONOLULU, HAWAII 96805

January 6, 2005

TO: Harold K. Yee, P.E., Chief Wastewater Branch
Department of Health

FROM: Micah Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for your letter dated September 7, 2004 providing comments on the subject project.

DHHL acknowledges the Department of Health has determined that connection to the County sewer service system at this time may not be reasonable and therefore, will allow the construction and use of individual wastewater treatment systems which must comply with the wastewater rules in effect at the time the awardees applies for a building permit. This information will provided in the Final EA.

Again, thank you for your determination to allow the awardees of the subject subdivisions to use individual wastewater systems for the disposal of wastewater until the County sewer service system becomes available.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

In reply, please refer to:
File:

September 22, 2004

04-862A CAB

Mr. Mich Hirano
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

SUBJECT: Draft Environmental Assessment for the Proposed Hawaiian Homestead Land Subdivision at Waiohuli, Maui

This letter is to transmit the following comments on the subject document:

Control of Fugitive Dust:

There is a significant potential for fugitive dust emissions during all phases of construction. Proposed construction activities will occur in proximity to existing residences and major thoroughfares, thereby exacerbating potential dust problems. It is recommended that a dust control management plan be developed which identifies and addresses all activities that have a potential to generate fugitive dust. Implementation of adequate dust control measures during all phases of development and construction activities is warranted.

Construction activities must comply with the provisions of Hawaii Administrative Rules, §11-60.1-33 on Fugitive Dust.

The contractor should provide adequate measures to control dust from the road areas and during the various phases of construction. These measures include, but are not limited to, the following:

a) Plan 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) Provide an adequate water source at the site prior to start-up of construction activities;

c) Landscape and provide rapid covering of bare areas, including slopes, starting from the initial grading phase;
d) Minimize dust from shoulders and access roads;
e) Provide adequate dust control measures during weekends, after hours, and prior to daily start-up of construction activities; and
f) Control dust from debris being hauled away from the project site.

If you have any questions, please contact Mr. Barry Ching of my staff at 586-4200.

Sincerely,

WILFRED K. NAGAMINE
Manager, Clean Air Branch

BC:jhm

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

TO: Wilfred K. Nagamine, Manager Clean Air Branch
Department of Health

FROM: Micah Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for your letter dated September 22, 2004 providing comments on the subject project. We would like to provide the following information in response to your comments.

Response to Comments on Control of Fugitive Dust

A dust control management plan will be developed to identify all activities that have a potential to generate fugitive dust and provide mitigation actions which will be employed to minimize fugitive dust impacts.

Construction activities will comply with the provisions of Hawaii Administrative Rules, Section 11-60.1-33 on Fugitive Dust. Measures to control dust from the road areas and during the various phases of construction will be identified and implemented which will include the measures identified in your comment letter.

Should you have any questions, please Darrell Ing of our Land Development Division at 586-3844.

SEP 03 2004

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
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
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

September 2, 2004

LD-NAV
DEA
DHHLWAIOHULISUB.RCM2

Munekiyo and Hiraga, Inc.
Mich Hirano, AICP
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

SUBJECT: Draft Environmental Assessment (DEA)
Project: DHHL Residential Subdivisions at Waiohuli, Maui
TMK: 2nd/ 2-2-002: Portion of 056

Thank you for the opportunity to review and comment on the subject matter.

The Department of Land and Natural Resources' (DLNR) Land Division distributed a copy of the DEA pertaining to the subject matter the following DLNR Divisions for their review and comment:

- Division of Forestry & Wildlife
- Division of State Parks
- Commission on Water Resource Management
- Engineering Division
- Office of Conservation and Coastal Lands
- Land-Maui District Land Office
- Land-Planning and Development

Enclosed please find a copy of the Commission on Water Resource Management and Engineering Division comment.

Based on the attached responses, the Department of Land and Natural Resources has no other comment to offer.

If you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at (808) 587-0384.

Very truly yours,

DIERDRE S. MAMIYA
Administrator

C: MDLO

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION

2004 AUG 17 P 3:27

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
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
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 10, 2004

LD/NAV L-547
DHHLWAIOHULISUBDEA.CMT2

Suspense Date: 8/18/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (DD)
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the DEA dated July 2004 pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note:** **One copy of the DEA is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no comments.

( ) Comments attached.

Date: AUG 16 2004

Signed: Paul J Conry

Name: PAUL J. CONRY, ADMINISTRATOR
DIVISION OF FORESTRY AND WILDLIFE

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
04 AUG 13 A 8:02

RECEIVED
LAND DIVISION
2004 AUG 19 A 10:23

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
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
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FORESTRY AND WILDLIFE
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KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

August 10, 2004

LD/NAV L-547
DHHLWAIOHULISUBDEA.CMT2

Suspense Date: 8/18/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (DD)
*XXX Land-Planning and Development

FR:

FROM: Dierdre S. Mamiya, Administrator
Land Division

RECEIVED
'04 AUG 12 P3:49
DEPT. OF LAND & NATURAL RESOURCES
STATE OF HAWAII

SUBJECT: Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the DEA dated July 2004 pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note:** **One copy of the DEA is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

( ) We have no comments.

(✓) Comments attached.

Signed: [signature]

Name: Yvonne Y. Izu

Date: _____

LINDA LINGLE
GOVERNOR OF HAWAII

PETER T. YOUNG
CHAIRPERSON

MEREDITH J. CHING
CLAYTON W. DELA CRUZ
JAMES A. FRAZIER
CHIYOME L. FUKINO, M.D.
LAWRENCE H. MIIKE, M.D., J.D.
STEPHANIE A. WHALEN

YVONNE Y. IZU
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

August 17, 2004

TO: Ms. Dede Mamiya, Administrator
Land Division

FROM: Yvonne Y. Izu, Deputy Director
Commission on Water Resource Management (CWRM)

SUBJECT: Draft Environmental Assessment, DHHL Waiohuli Subdivision, Maui. 2-2-02:56

FILE NO.: DHHLWAIOHLISUBDEA.CMT2

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas, which are important for the maintenance of streams and the replenishment of aquifers.

[X] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[X] We recommend coordination with the Land Division of the State Department of Land and Natural Resources to incorporate this project into the State Water Projects Plan.

[ ] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[ ] A Well Construction Permit and/or a Pump Installation Permit from the Commission would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the Commission would be required prior to use of this source.

[ ] Groundwater withdrawals from this project may affect streamflows, which may require an instream flow standard amendment.

[ ] We are concerned about the potential for degradation of instream uses from development on highly erodible slopes adjacent to streams within or near the project. We recommend that approvals for this project be conditioned upon a review by the corresponding county's Building Department and the developer's acceptance of any resulting requirements related to erosion control.

[ ] If the proposed project includes construction of a stream diversion, the project may require a stream diversion works permit and amend the instream flow standard for the affected stream(s).

[ ] If the proposed project alters the bed and banks of a stream channel, the project may require a stream channel alteration permit.

[X] OTHER: Potable water will be from the existing Kula and Makawao water systems which are fed by surface water sources. These water systems are already subject to water use restrictions during drought periods. We believe it would be appropriate for the Maui County/Local Drought Committee to consider potential drought implications upon the Kula and Makawao water systems in the development of County-based drought mitigation strategies.

If there are any questions, please contact Dean Nakano at 587-0240.

LINDA LINGLE
GOVERNOR OF HAWAII

RECEIVED
LAND DIVISION
2004 AUG 19 A 10:39

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
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

August 10, 2004

LD/NAV L-547
DHHLWAIOHULISUBDEA.CMT2

Suspense Date: 8/18/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (DD)
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the DEA dated July 2004 pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note: One copy of the DEA is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(X) We have no additional comments. Our previous comments to the early consultation for preparation of a Draft EA were incorporated in the Draft EA document. ( ) Comments attached.

Date: 8/17/04

Signed:

ERIC T. HIRANO, CHIEF ENGINEER

Name:

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

YVONNE Y. IZU
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AQUATIC RESOURCES
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CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

August 10, 2004

LD/NAV L-547
DHHLWAIOHULISUBDEA.CMT2

Suspense Date: 8/18/04

MEMORANDUM:

TO: *XXX Division of Forestry & Wildlife
*XXX Engineering Division
*XXX Division of State Parks
*XXX Commission on Water Resource Management
*XXX Office of Conservation and Coastal Lands
XXX Land-Maui District Land Office (DD)
*XXX Land-Planning and Development

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment
Project: Hawaiian Homelands Subdivision at Waiohuli
Applicant: Department of Hawaiian Homelands (SOH)
Consultant: Munekiyo & Hiraga, Inc. (808-244-8729)
TMK: 2nd/ 2-2-002: Portion of 056

Please review the DEA dated July 2004 pertaining to the subject matter and submit your comments (if any) on Division letterhead signed and dated by the suspense date.

***Note:** **One copy of the DEA is available for your review in the Land Division Office, Room 220.**

Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0384.

If this office does not receive your comments by the suspense date, we will assume there are no comments.

(✓) We have no comments.

( ) Comments attached.

Signed: Jason K. Koga

Name: Jason K. Koga

Date: 8-17-04

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

TO: Dierdre S. Mamiya, Administrator
Land Division
Department of Land and Natural Resources

FROM: Micah Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for your letter dated September 2, 2004 providing comments on the subject project from divisions within your department. We wish to provide the following information in response to the comments.

Response to Comments from Commission on Water Resource Management

Coordination has been carried out with the County of Maui, Department of Water Supply to incorporate the project into the County's Water Use and Development Plan.

We note your comments regarding the potential for drought and water use restrictions during drought periods.

We note the Division of Forestry and Wildlife, Engineering Division and the Maui District Office have no additional comments on the Draft EA.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

LINDA LINGLE
GOVERNOR

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

OCT 1 4 2004

RODNEY K. HARAGA
DIRECTOR

Deputy Directors
BRUCE Y. MATSUI
LINDEN H. JOESTING
BRIAN H. SEKIGUCHI

IN REPLY REFER TO:

STP 8.1372

October 8, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.,
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

Subject: Hawaiian Homestead Land Subdivision at Waiohuli, Maui
Draft Environmental Assessment (DEA)
TMK: 2-2-02: POR 56

In response to your request for our review of the subject environmental document for the proposed subdivision project (comprised of three subdivisions – Waiohuli Uka, Waiohuli Lot 134, and Waiohuli Hikina), we are providing the following comments:

1. The combined and full development of the existing 690+ acre Kula Residential Lot, Unit 1 Subdivision and the proposed 121.7 acre subdivision project will have an adverse impact on our highway facilities. An updated study to review the various and total impacts of the development, based on full build-out of the entire (combined) subdivision areas, should be required. The study should a) supplement the traffic report provided in the draft environmental assessment, b) update any earlier traffic analysis that was done when the Unit 1 Subdivision lots were developed, c) check the compliance items outlined by Maui County in 1995 for the Unit 1 Subdivision, and d) address regional traffic impacts along Kula Highway from the development through and including Haleakala Highway. The updated assessment should be submitted to our department for review and determination of conditions, requirements or mitigation measures that may be necessary.

2. Even without the project, it is unlikely that all of the roadway improvements recommended in the traffic report (Page 70-71) will be implemented by 2007. Therefore, interim mitigation measures and/or improvements should be identified and implemented.

3. The study should address roadway and intersection improvements, such as but not limited to auxiliary lanes (storage, acceleration/deceleration, etc.) that the applicant should provide to accommodate the additional traffic onto and off of Kula Highway from the development, as build-out of the development occurs.

4. Kula Highway presently has a 60-foot wide right-of-way at the affected site. An additional setback of at least 30-feet along the entire frontage of the subdivisions and the adjacent lands should be reserved and dedicated to the State at the request of our Department for future highway widening and as a necessary mitigation measure. The setback and proposed width should be identified on the subdivision maps.

5. To preserve capacity and control multiple accesses on to the highway, Pueo Drive and Lau'ie Drive should be used as the accesses to Kula Highway for all of the lots in both subdivisions (Unit 1 and the proposed subject). If feasible, access for the Waiohuli Lot 134 subdivision should be directed to either Pueo Drive or Lau'ie Drive and not directly to Kula Highway. Identification and notation of access restriction should also be shown on the subdivision maps along Kula Highway right-of-way on both sides of the street accesses to Kula Highway.

   The applicant should contact our Highways Division Right-of-Way Branch to discuss any specific applicable terms and conditions.

6. No additional stormwater runoff from the development should be permitted onto Kula Highway.

7. Plans for all construction work within or adjoining our highway right-of-way, along with required and applicable environmental permits and other necessary construction permits, must be submitted to our Highways Division for review and approval.

8. The applicant should be required to participate in and contribute to its fair share of regional and local transportation improvements as determined by our department and/or the county.

Very truly yours,

RODNEY K. HARAGA
Director of Transportation

c: Michael W. Foley, Maui Department of Planning
William Makanui III, Department of Hawaiian Home Lands

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

TO: Honorable Rodney K. Haraga, Director
Department of Transportation

FROM: Micah A. Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for the letter dated October 8, 2004 providing comments on the Draft Environmental Assessment (EA) for the subject project. We would like to provide the following information in response to your comments.

Response to Comment No. 1

As noted in the EA, the Department of Hawaiian Home Lands (DHHL) acknowledges that the combined and full development of the existing 690-acre Kula Residential Lot, Unit 1 Subdivision and the proposed combined 121.7-acre subdivision project will impact State highway facilities in the vicinity of the project. DHHL is in the process of finalizing the Maui Island Plan, which provides a comprehensive resource for planning and managing more than 31,000 acres of DHHL lands on Maui. This plan examines the infrastructure needs and opportunities from an island-wide perspective, gauges beneficiary needs and demands and estimates the cost for both on- and off-site infrastructure to support the development of these lands. We therefore suggest that DHHL and the Department of Transportation address regional traffic impacts on an island-wide basis, rather than individually, and jointly review and incorporate the required highway transportation improvements into the 5-year State Transportation Improvement Program (STIP) for the island of Maui. DHHL will support DOT in its request to the legislature for appropriation of funds to carry out regional roadway improvements on State highway facilities as identified for the DHHL projects in the STIP.

There are no outstanding compliance items outlined by Maui County in 1995 for the Unit 1 Subdivision. Final approval for the Kula Residence Lots Subdivision, Unit 1 was granted by the County on February 7, 2002. The approval letter is enclosed for your reference.

Response to Comment No. 2

See response to Comment No. 1.

Response to Comment No. 3

Traffic Impact Analysis Report (TIAR), indicates that the development of the project could potentially generate approximately 42 and 36 total trips during the AM and PM peak hours of traffic, respectively. The TIAR further indicates no improvements are required to mitigate traffic impacts in the immediate vicinity of the subject development. The Levels of Service (LOS) for the Year 2007 "with project" conditions (which also include the Kula Residential Lots, Unit 1 Subdivision and the Keokea Farm Lots) at the Kula Highway/ Pueo Drive, Kula Highway/Waiohuli Lot 134 Roadway, and Kula Highway/Lau'ie Drive intersections are projected to operate at LOS A for the AM and PM, northbound left-turn/through movements and LOS B for the AM and PM, eastbound left-turn/right-turn movements, respectively. As such, exclusive left-turn and right-turn lanes on Kula Highway at the access point to the project are not warranted.

Response to Comment No. 4

DHHL confirms an additional setback of 30 feet along the entire frontage of the subdivisions and the adjacent lands will be reserved and dedicated to the State at the request of the State Department of Transportation for future highway widening and as a necessary mitigative measure.

Response to Comment No. 5

DHHL has reviewed your comments regarding limiting access on Kula Highway with the consultant traffic engineer and civil engineer. Unfortunately, due to the existing topography, a crossing (bridge or culvert) would be required to connect the access from Lot 134 (4-lot subdivision) to Pueo Drive or

Lau'ie Drive as suggested. As it is cost prohibitive to provide access from Pueo or Lau'ie Drive, DHHL will be requesting direct access to Kula Highway from the Waiohuli Lot 134, 4-lot subdivision. Identification and notation of access restrictions will be shown on the subdivision, maps along Kula Highway on both sides of the street accesses to Kula Highway, as requested.

Response to Comment No. 6

Drainage system improvements will be designed to ensure no additional stormwater runoff from the development will adversely impact or flow onto Kula Highway.

Response to Comment No. 7

DHHL confirms plans for all construction work within or adjoining the State highway right-of-way, as well as applicable environmental permits and other necessary construction permits will be submitted to the DOT, Highways Divisions for review and approval.

Response to Comment No. 8

See response to Comment No. 1.

encl.

JAMES "KIMO" APANA
Mayor

DAVID C. GOODE
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
LAND USE AND CODES ADMINISTRATION
250 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH M. NAGAMINE, L.S., P.E.
Land Use and Codes Administration

Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

JOHN D. HARDER
Solid Waste Division

BRIAN HASHIRO, P.E.
Highways Division

February 7, 2002

Ms. Adrienne W.L.H. Wong, P.E.
AUSTIN, TSUTSUMI & ASSOCIATES, INC.
1871 Wili Pa Loop, Suite A
Wailuku, Hawaii 96793

SUBJECT: **KULA RESIDENCE LOTS SUBDIVISION, UNIT I**
TMK: (2) 2-2-002:POR. OF 056
LUCA FILE NO. 2.2305

Dear Ms. Wong:

Final approval for the subject subdivision has been granted on February 7, 2002. A set of approved final plats are enclosed for your records.

If you have any questions regarding this letter, please call Mr. Lance Nakamura of our Land Use and Codes Administration at 270-7252.

Very truly yours,

for DAVID GOODE
Director of Public Works
And Waste Management

Enclosure
LSN:ay S:\LUCA\ALL\SUBDN.UCASUBD\REG2\2#2305-1.fin
xc: Dept. of Finance, Real Property Tax Division w/final plat
Dept. of Finance, Tax Map Division w/final plat
Building Permit Section w/final plat
Engineering Division w/final plat
Dept. of Planning w/final plat
Dept. of Water Supply, SD 95-49 w/final plat
Police Dept. w/final plat
State Dept. of Health w/final plat
DOT, Highways Branch w/final plat
Maui Electric Co. w/final plat

EXHIBIT A

LINDA LINGLE
GOVERNOR OF HAWAII

SEP 08 2004

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186
E-mail: oeqc@health.state.hi.us

September 7, 2004

Mr. Micah Kane, Director
Department of Hawaiian Home Lands – State of Hawai'i
P.O. Box 1879
Honolulu, Hawai'i 96805

Mr. Michael T. Munekiyo
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawai'i 96793

Dear Ms. Ishida and Mr. Ishii:

The Office of Environmental Quality Control (OEQC) has reviewed the draft environmental assessment for the Hawaiian Homestead Land Subdivision at Waiohuli, Tax Map Keys 3-7 (various), in the judicial district of Wailuku and offers the following comment for your consideration.

1. SUSTAINABLE BUILDING GUIDELINES, NATIVE PLANT LANDSCAPING: Please consider using the guidance on sustainable building and landscaping with xerophagic native plants in the subdivision. Please refer to our Internet site at http://www.state.hi.us/health/oeqc/index.html.
2. WASTEWATER: We understand that a five-year variance renewal was granted by the Department of Health on July 18, 2002, for the exisiting Kula Residential Subdivision, leaving a net balance of 65 houselots being covered by the variance for the proposed project. Since the project encompasses 99 houselots, please discuss plans for the remaining 34 houselots in the final environmental assessment.

Thank you for the opportunity to comment. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at (808) 586-4185.

Sincerely,

Genevieve Salmonson

GENEVIEVE SALMONSON
Director

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

TO: Genevieve Salmonson, Director
Office of Environmental Quality Control

FROM: Micah A. Kane, Chairman
Hawaiian Homes Commission

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui, TMK 2-2-02:por. 56

Thank you for your letter dated September 7, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

1. Response to Comments on Sustainable Building Guidelines, Native Plant Landscaping

DHHL will provide homestead land awardees information on sustainable building guidelines. As identified in the Draft EA, 15 native plant species, of which 12 species are indigenous and 3 species are endemic were found on the subject lands during the botanical survey carried out in 1995. DHHL will advise awardees regarding the existence of the native plants in the project area and encourage the use of these plants in the landscaping of the properties.

2. Response to Comments on Wastewater

DHHL confirms that a five-year variance renewal for the Kula Residence Lots Unit 1, Waiohuli, Kula, Maui was granted by the Department of Health with conditions on July 18, 2002. Upon review of the Draft EA for the subject project, the Department of Health has determined by letter dated September 7, 2004 that connection to the County sewer service system for the subject project at this time may not be reasonable and, therefore, will allow the construction and use of individual wastewater treatment systems which must comply with the wastewater rules in effect at the time the awardees applies

for a building permit. A copy of this letter is enclosed. This information will be provided in the Final EA.

Comments or questions regarding the subject project may be directed to Darrell Ing of our Land Development Division at 586-3844.

enc.

LINDA LINGLE
GOVERNOR OF HAWAII

SEP 10 2004

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

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

In reply, please refer to:
EMD / WB

September 7, 2004

M2 2 002 056.wpd
w11 wb040771

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 014
Wailuku, Maui, Hawaii 96793

Dear Mr. Hirano:

Subject: **Proposed Hawaiian Homestead Land Subdivisions at Waiohuli - Draft Environmental Assessment**
TMK: (2) 2 - 2 - 002: 056

We have reviewed the subject document which proposes to create three (3) residential subdivisions on Hawaiian homestead lands at Waiohuli in Kula, Maui, Hawaii. The proposed action addresses the need for improved houselots for residential construction and occupancy by Hawaiian homestead land lessees.

We have the following comments to offer. We have determined that an Application for Variance was filed and granted by the Department of Health on July 18, 2002 for the Kula Residence Lots Unit 1, Waiohuli, Kula, Maui, Hawaii (Variance Application No. WW 112 R / Docket No. 01-VWW-05). We recommend connection to the County sewer service system for all dwellings/lot when it becomes available. However, as that may not be reasonable at this time, we will allow the construction and use of treatment individual wastewater systems which must comply with the wastewater rules in effect at the time the lessee applies for a building permit.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at direct toll free no. 984-2400, extension 64294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

c: June Harrigan-Lum, EPO

EXHIBIT A

Attachment: Variance Application No. WW 112R, Docket No. 01-VWW-05

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

OCT 19 2004

HRD04/1503

September 24, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Re: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli Draft Environmental Assessment

Dear Mr. Hirano:

The Office of Hawaiian Affairs (OHA) is in receipt of your August 5, 2004, request for review and comments on the aforementioned project, which is a proposal by the Department of Hawaiian Homelands (DHHL) to create three (3) residential subdivisions on Hawaiian homestead lands at Waiohuli in Kula, Island of Maui. OHA apologizes for the delayed response and offers the following comments and concerns.

According to the submitted Draft Environmental Assessment (DEA), as of January 31, 2004, there were a total of 6,679 individuals on the waiting list for Hawaiian homestead on the island of Maui alone. OHA commends this effort by DHHL to reduce the waiting list by providing sustainable home lots for the native Hawaiian population through implementation of the Waiohuli projects.

It also appears that the December 8, 1997 MOU executed between the Maui Department of Water Supply and DHHL to cooperate with each other, and to construct water systems and improvements, to provide potable water to DHHL lands such as Waiohuli is headed towards successful implementation.

With regards to the DEA for the DHHL project at Waiohuli, OHA offers the following comments, concerns and suggestions in the areas of Native Flora and Fauna, and Historical Cultural Resources.

Native Flora and Fauna

The DEA identifies at least fifteen native plant species in the project area with twelve indigenous, and three endemic, or native only to the Hawaiian Islands. OHA suggests that awardees be provided with some type of educational literature on the existence of these native plants in the project area and be encouraged to utilize such plants in the landscaping of their surroundings where appropriate.

It may be possible to coordinate with the Department of Land and Natural Resources (DLNR) or Department of Agriculture (DA), to obtain seedlings or cuttings, to propagate for those homesteaders who may desire to utilize these native plants which are already known to thrive in the area.

With regards to native faunal species in the area, the Amakihi and Pacific golden plover were observed during the avifaunal survey. The pu'eo, known to inhabit the region from oral ethnographies and other documented sources should be included in the list of native birds in the area even though none were observed during the limited avifaunal survey.

Like our suggestions regarding the native plants, it would be advantageous to inform and educate the awardees on the known existence of these native birds in the project area for educational purposes and to encourage the protection and successful cohabitation by all who will call the area home.

Historical and Cultural Resources

According to the DEA, Paul H. Rosendahl, Inc. performed an archaeological survey of the project area in conjunction with a 1989 survey covering both the Waiohuli and Keokea parcels. At least fifty-one sites were identified. Scientific Consultant Services, Inc. performed data recovery in 1998 on ten of the fifty-one sites and an additional new site discovered.

There were three burial locations identified and a burial treatment plan was prepared and submitted to the Maui/Lana'i Islands Burial Council and approved at their February 28, 2002 meeting.

The DEA provides that the clearing and grubbing of previously undeveloped land will occur as well as some excavation and embankment within the road right of way. It further states:

> *Should any archaeological features, cultural artifacts, or human remains be inadvertently located during construction of the project, work in the immediate area of the find will be halted and the find will be protected from further disturbance. The SHPD will be immediately notified to determine the significance of the find and establish appropriate mitigative measures.*

OHA notes that DHHL land is considered "tribal lands" under NAGPRA and that specific requirements are set forth in that Federal legislation regarding inadvertent discoveries of human skeletal remains. OHA is one of several native Hawaiian organizations which need to be notified and consulted on any such find.

OHA is pleased that the Waiohuli Homesteaders Association has an archaeological resources director who will work with lessees to locate, preserve and maintain known archaeological sites on their individual lots prior to the commencement of grubbing and clearing activities.

While the DEA notes that DHHL will notify Hawaiian homestead land awardees about the presence of archaeological sites on their lots, the Waiohuli Homesteaders Association should be notified regarding

cultural sites located in common areas as well as close to the boundaries of the individuals lots since they may be adversely affected by human activities.

While the current trend of archaeological review from the State Historic Preservation Division (SHPD) regarding site significance assessments states that some sites are important only for their information value and thus can be destroyed during data recovery, DHHL is in a unique position to show that native Hawaiian cultural sites can be very important for a multitude of reasons and their preservation should be a paramount concern.

Summary

OHA is overall supportive of the proposed DHHL development and recommends that educational opportunities for awardees be utilized in the areas of native flora and fauna, as well as in the protection of historical and cultural sites.

DHHL may be able to strive for new standards in land development, and combine an increased level of protection and preservation for Hawai'i's unique heritage and legacy with an excellent educational and awareness initiative.

If you have any questions or concerns, please contact Kai Markell, Policy Advocate, at 594-1945 or kaim@oha.org. Once again, thank you for your patience during our review and assessment of this important matter.

'O wau iho nō,

Clyde W. Nāmu'o
Administrator

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Mr. Clyde W. Namu`o, Administrator
Office of Hawaiian Affairs
711 Kapi`olani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Mr. Namuo:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter dated September 24, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

Response to Comments on Native Flora and Fauna

DHHL will advise awardees regarding the existence of the native plants in the project area and encourage the use of these plants in the landscaping of the homestead properties, as suggested.

With respect to the survey of avifauna and feral mammals, it is noted in the Draft Environmental Assessment (EA) that the Short-eared Owl (also known as, Pueo) occurs in the Kula and Upcountry region, although none were recorded during the field investigation. It further notes, none of the avifauna, with the exception of the Pueo, is listed as rare, threatened or endangered. DHHL will advise awardees regarding the existence of native birds in the region and the need for protection of their habitats.

Response to Comments on Historical and Cultural Resources

As required by the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), OHA will be notified and consulted on inadvertent discoveries of human skeletal remains.

Further, DHHL will notify the Waiohuli Homesteaders Association regarding the presence of the cultural sites located in common areas, as well as close to the boundaries of the individual lots.

Should you have any questions, please call me at 586-3801. Comments or questions regarding the subject project may be directed to Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

ALAN M. ARAKAWA
MAYOR

CARL M. KAUPALOLO
CHIEF

NEAL A. BAL
DEPUTY CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE AND PUBLIC SAFETY

200 DAIRY ROAD
KAHULUI, MAUI, HAWAII 96732
(808) 270-7561
FAX (808) 270-7919

AUG 12 2004

August 10, 2004

Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street Suite 104
Wailuku, HI 96793

Subject: **Proposed Hawaiian Homestead Land Subdivisions at Waiohuli**

Dear Mich Hirano,

I have had the opportunity to review the above subject and offer the following comments. It appears that this project will be large and complex. A thorough review of the project will be conducted when details are submitted to our office during the permit process. The Department of Fire & Public Safety will be involved with the project through plans review and will also be on site periodically during the construction process.

Sincerely,

Jeff Drechsel
Fire Prevention Bureau

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Mr. Jeff Drechsel
Fire Prevention Bureau
County of Maui
Department of Fire and Public Safety
200 Dairy Road
Kahului, Hawaii 96732

Dear Mr. Drechsel:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter dated August 10, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

DHHL acknowledges that the Maui Department of Fire and Public Safety will conduct a more thorough review of the project plans during the building permit application process.

Should you have any questions, please Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

DEPARTMENT OF
HOUSING AND HUMAN CONCERNS
COUNTY OF MAUI

AUG 17 2004
ALAN M. ARAKAWA
Mayor

ALICE L. LEE
Director

HERMAN T. ANDAYA
Deputy Director

200 SOUTH HIGH STREET • WAILUKU, HAWAII 96793 • PHONE (808) 270-7805 • FAX (808) 270-7165

August 11, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

SUBJECT: HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI

We have reviewed the draft Environmental Assessment for the subject subdivisions and would like to affirm our support of the three proposed subdivisions which will provide a total of ninety-nine (99) improved residential houselots.

Thank you for the opportunity to comment.

Very truly yours,

ALICE L. LEE
Director

ETO:hs

c: Housing Administrator

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Honorable Alice Lee, Director
County of Maui
Department of Housing and Human Concerns
200 South High Street
Wailuku, Hawaii 96793

Dear Ms. Lee:

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter of August 11, 2004, regarding the Draft Environmental Assessment (EA) for the proposed Waiohuli-DHHL Subdivision at Kula, Maui.

We gratefully acknowledge your support of the three proposed subdivisions.

Should you have any questions regarding the project, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

ALAN M. ARAKAWA
Mayor

AUG 25 2004

GLENN T. CORREA
Director

JOHN L. BUCK III
Deputy Director

(808) 270-7230
Fax (808) 270-7934

DEPARTMENT OF PARKS & RECREATION

700 Hali'a Nakoa Street, Unit 2, Wailuku, Hawaii 96793

August 17, 2004

Mr. Mitch Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

SUBJECT: PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI, DRAFT ENVIRONMENTAL ASSESSMENT

We have reviewed the Draft Environmental Assessment for the subject project and have no comments to offer at this time.

Thank you for the opportunity to review and comment. Should there be any questions, please contact Mr. Patrick Matsui, Chief of Parks Planning and Development, at 270-7387.

Sincerely,

GLENN T. CORREA
Director

c: Patrick Matsui, Chief of Planning and Development

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII

DEPARTMENT OF HAWAIIAN HOME LANDS

P.O. BOX 1879

HONOLULU, HAWAII 96805

January 6, 2005

Honorable Glenn T. Correa, Director
County of Maui
Department of Parks & Recreation
700 Hali'a Nakoa Street, Unit 2
Wailuku, Hawaii 96793

Dear Mr. Correa:

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter of August 17, 2004, regarding the Draft Environmental Assessment (EA) for the proposed Waiohuli-DHHL Subdivision at Kula, Maui.

We acknowledge that you have no comments at this time.

Should you have any questions regarding the project, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

ALAN M. ARAKAWA
Mayor

MICHAEL W. FOLEY
Director

WAYNE A. BOTEILHO
Deputy Director

SEP 0 8 2004

COUNTY OF MAUI
DEPARTMENT OF PLANNING

September 7, 2004

Mr. Mich Hirano
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Hawaii 96793

Dear Mr. Hirano:

RE: Draft Environmental Assessment for the Proposed Hawaiian Homestead Land Subdivisions at Waiohuli, TMK: 2-2-002: 056 (portion), Waiohuli, Kula, Island of Maui, Hawaii (LTR 2004/2931)

The Maui Planning Department (Department) is in receipt of the above referenced document and provides the following comments:

1. The Traffic Impact Analysis Report (TIAR) provides a discussion of several measures recommended to mitigate anticipated increases in traffic. These recommendations were made in addition to those roadway improvements currently planned by the State of Hawaii, Department of Transportation. Discuss the means by which these recommendations may be implemented. Will the Department of Hawaiian Homelands (DHHL) contribute to the implementation of any of the mitigative measures?

Thank you for the opportunity to comment. Should you required additional clarification, please contact Ms. Kivette A. Caigoy, Environmental Planner, at 270-7735.

Sincerely,

for MICHAEL W. FOLEY
Planning Director

MWF:KAC:lar
c: Wayne Boteilho, Deputy Planning Director
Kivette A. Caigoy, Environmental Planner
DHHL
OEQC
TMK File
General File
K:\WP_DOCS\PLANNING\EA\DEAComments\2004\2931_WaiohuliHawaiianHmstd.wpd

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Honorable Michael W. Foley, Director
Department of Planning
County of Maui
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Foley:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli,
Maui, TMK 2-2-02:por. 56

Thank you for the letter dated September 7, 2004 providing comments on the Draft Environmental Assessment (EA) for the subject project. We would like to provide the following information in response to your comments.

Response to Comment No. 1

The Department of Hawaiian Home Lands (DHHL) acknowledges that the combined and full development of the existing 690-acre Kula Residential Lot, Unit 1 Subdivision and the proposed combined 121.7-acre subdivision project will impact State highway facilities in the vicinity of the project. DHHL is in the process of finalizing the Maui Island Plan, which provides a comprehensive resource for planning and managing more than 31,000 acres of DHHL lands on Maui. This plan examines the infrastructure needs and opportunities from an island-wide perspective, gauges beneficiary needs and demands and estimates the cost for both on- and off-site infrastructure to support the development of these lands.

DHHL has requested that the Department of Transportation (DOT) address regional traffic impacts on an island-wide basis, rather than individually and DHHL and DOT jointly review and incorporate the required highway transportation improvements into the 5-year State Transportation Improvement Program (STIP) for the island of Maui. DHHL will also support DOT in a request to the legislature for appropriation of funds to

carry out regional roadway improvements on State highway facilities as identified for the DHHL projects in the STIP.

Comments or questions regarding the subject project may be directed to Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Micah A. Kane, Chairman
Hawaiian Homes Commission

ALAN M. ARAKAWA
Mayor

GILBERT S. COLOMA-AGARAN
Director

MILTON M. ARAKAWA, A.I.C.P.
Deputy Director

Telephone: (808) 270-7845
Fax: (808) 270-7955

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS AND ENVIRONMENTAL MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Development Services Administration

TRACY TAKAMINE, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

JOHN D. HARDER
Solid Waste Division

October 14, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, Maui, Hawaii 96793

Dear Mr. Hirano:

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT
WAIOHULI - DHHL SUBDIVISION
TMK: (2) 2-2-002:056 (POR)

We reviewed the Draft Environmental Assessment (EA) and have the following comments:

1. Submit plan for disposal/composting of cleared and grubbed material and disposal/recycling of construction waste.

2. The Department's letter of March 31, 2003 noted in Chapter X is still applicable especially in relation to Comment No. 3 which states: "All roadways shall be constructed in accordance with County standards. No utility easements outside the road right-of-way should be dedicated or maintained by the County." We would add that utility easements are also meant to include drainage systems.

3. Maintenance of drainage improvements, street lighting, guardrails and other road appurtenances shall be documented as part of the EA.

If you have any questions regarding this letter, please call Milton Arakawa at 270-7845.

Sincerely,

GILBERT S. COLOMA-AGARAN
Director

GSCA:MA:da
S:\LUCA\CZM\Waiohulu-DHHL Subd_draft ea_22002056_da.wpd

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Honorable Gilbert S. Coloma-Agaran, Director
County of Maui
Department of Public Works and Environmental Management
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Coloma-Agaran:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter dated October 14, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

Response to Comment No. 1

DHHL will submit a plan for disposal/composing of cleared and grubbed material and disposal/recycling of construction waste to the Department of Public Works and Environmental Management as part of the building permit application process.

Response to Comment No. 2

As indicated in the Preliminary Engineering Report (Draft EA, Appendix D), the majority of the subdivision roadways were constructed during development of the Kula Residence Lots, Unit 1 Subdivision and are maintained by the County of Maui. The roadways included in the proposed Waiohuli Subdivision will be designed in accordance with County rural standards with the following exceptions:

Power lines will be installed overhead (for Waiohuli Uka, Waiohuli Hinina and Waiohuli Lot 134);

The cul-de-sacs may be more than 500 feet in length (for Waiohuli Uka and Waiohuli Hikina Subdivisions);

Cul-de-sacs may serve more than 20 lots (for Waiohuli Uka Subdivision);

Flag lots may be located back-to-back (for Waiohuli Uka, Waiohuli Hikina, and Waiohuli Lot 134 Subdivisions); and

Street trees will not be planted.

As allowed by the Hawaiian Homes Commission Act, 1920, DHHL is exempting itself from various County of Maui subdivision related statutes and regulations for the Waiohuli Uka, Waiohuli Hikina and Waiohuli Lot 134 Subdivisions as declared in the exemption letters included in Appendix B of the Draft EA.

Utility easements outside the roadway rights-of-way will remain under the control of the DHHL and be maintained by the department or the individual homestead lessee.

Response to Comment No. 3

Maintenance of drainage improvements, guardrails and other road appurtenances within the roadway rights-of-way will be turned over to the County of Maui for maintenance. Street lighting will be maintained through agreement with Maui Electric Company and DHHL. Improvements outside the rights-of-way will be maintained by the DHHL. This information will be included in the Final EA.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

SEP 0 3 2004

DEPARTMENT OF WATER SUPPLY
COUNTY OF MAUI

200 South High Street
WAILUKU, MAUI, HAWAII 96793
Telephone (808) 270-7816 • Fax (808) 270-7833

August 31, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku HI 96793

Dear Mr. Hirano:

SUBJECT: Proposed Hawaiian Homestead Land Subdivision at Waiohuli - TMK (2)2-2-002:056 p
Draft Environmental Assessment

Thank you for the opportunity to comment on this project proposal. We have attached a copy of our comments during the early consultation process.

According to the MOU and Water Credits Agreement entered into by DHHL and DWS , DWS will commit 500,000 gpd of potable water to DHHL homesites.(TMK 2-2-002:055 & 2-2-002:056 por). The current proposal involves a decrease in the number of houselots, from 112 to 99 on 121.69 acre lot. Based on per unit standard guidelines, the revised plan reduced the estimated usage from 67,200 to 59,400 gallons per day. In conversation with the applicant, we were informed that, to date, DHHL's cumulative estimated water allocation would be about 297,300 gallons per day, including this project and the 75 Keokea Farm Lots which is currently pending.

We encourage the applicant to integrate water conservation measures project design and construction and convey information to future homeowners, where applicable and adopt Best Management Practices (BMPs) provided in our comment letter of April 7, 2003.

Should you have any questions, please contact our Water Resources and Planning Division at 270-7199.

Sincerely,

George Y. Tengan
Director

eam
c: engineering division
applicant, with attachment
DWS comment letter of April 7, 2003

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Honorable George Tengan, Director
Department of Water Supply
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Tengan:

Subject: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter dated August 31, 2004 providing comments on the subject project. We wish to provide the following information in response to your comments.

DHHL will provide information on water conservation measures to awardees as suggested. DHHL will advise awardees regarding the existence of the native plants in the project area and encourage the use of these plants in the landscaping of the homestead properties.

Best management practices (BMPs) will be employed during grading and construction of improvements to minimize infiltration and runoff from construction and vehicle operations.

Should you have any questions, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

SEP 1 0 2004

ALAN M. ARAKAWA
MAYOR

OUR REFERENCE
YOUR REFERENCE ti

POLICE DEPARTMENT
COUNTY OF MAUI

55 MAHALANI STREET
WAILUKU, HAWAII 96793
(808) 244-6400
FAX (808) 244-6411

THOMAS M. PHILLIPS
CHIEF OF POLICE

KEKUHAUPIO R. AKANA
DEPUTY CHIEF OF POLICE

September 3, 2004

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 104
Wailuku, HI 96793

Dear Mr. Hirano:

SUBJECT: Proposed Hawaiian Homestead Land Subdivisions at Waiohuli – Draft Environmental Assessment

Thank you for your letter of August 5, 2004, requesting comments on the above subject.

We have reviewed the proposed assessment and have enclosed our comments. We are returning the draft environmental assessment which was submitted for our review. As always, thank you for giving us the opportunity to comment on this project.

Very truly yours,

Acting Assistant Chief George Fontaine
for: Thomas M. Phillips
Chief of Police

Enclosures

COPY

TO : THOMAS PHILLIPS, CHIEF, MAUI POLICE DEPARTMENT

VIA : CHANNELS

FROM : RANDALL BURGESS, P.O.III, COMMUNITY POLICING

SUBJECT : PROPOSED HAWAIIAN HOMESTEAD LAND SUBDIVISIONS AT WAIOHULI DRAFT ENVIRONMENTAL ASSESSMENT

Sir, this To/From is being submitted in regards to police comments/recommendations to the proposed Hawaiian Homestead Land Subdivisions at Waiohuli - Draft Environmental Assessment.

Site inspection and project review revealed no police comments/recommendations at this time.

Respectfully submitted,
Randall Burgess
Randall BURGESS #1023
082604 @ 1500 hours

Concur with Officer Burgess as this project location is encorporated into the present Hawaiian Homestead Land project and does appear to adversely affect the surrounding area.
8/31/04

concur,
8/31/04

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

MICAH A. KANE
CHAIRMAN
HAWAIIAN HOMES COMMISSION

BEN HENDERSON
DEPUTY TO THE CHAIRMAN

KAULANA H. PARK
EXECUTIVE ASSISTANT

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

January 6, 2005

Honorable Thomas M. Phillips, Chief of Police
County of Maui
Police Department
55 Mahalani Street
Wailuku, Hawaii 96793

Dear Chief Phillips:

SUBJECT: Draft Environmental Assessment
Hawaiian Home Lands Subdivisions at Waiohuli, Maui,
TMK 2-2-02:por. 56

Thank you for your letter of September 3, 2004, regarding the Draft Environmental Assessment (EA) for the proposed Waiohuli-DHHL Subdivision at Kula, Maui.

We acknowledge that you have no comments/recommendations.

Should you have any questions regarding the project, please call Darrell Ing of our Land Development Division at 586-3844.

Aloha and mahalo,

Ben Henderson

Micah A. Kane, Chairman
Hawaiian Homes Commission

References

References

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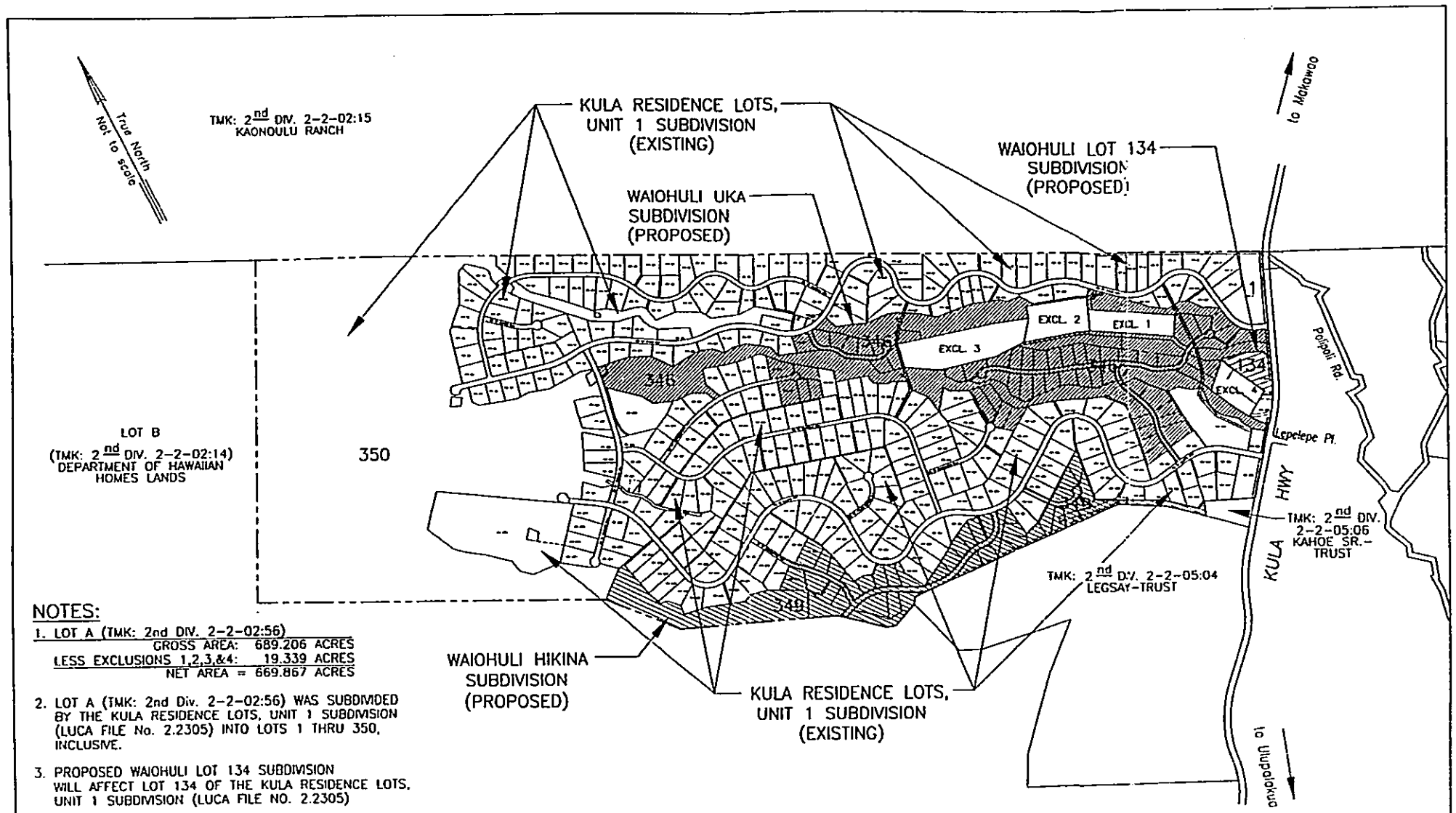
Appendices

Appendix A

Preliminary Subdivision Plans



NOTES:

1. LOT A (TMK: 2nd DIV. 2-2-02:56)
   GROSS AREA: 689.206 ACRES
   LESS EXCLUSIONS 1,2,3,&4: 19.339 ACRES
   NET AREA = 669.867 ACRES

2. LOT A (TMK: 2nd Div. 2-2-02:56) WAS SUBDIVIDED BY THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE No. 2.2305) INTO LOTS 1 THRU 350, INCLUSIVE.

3. PROPOSED WAIOHULI LOT 134 SUBDIVISION WILL AFFECT LOT 134 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI UKA SUBDIVISION WILL AFFECT LOTS 112, 137, 193, 194, 195, 343, & 346 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

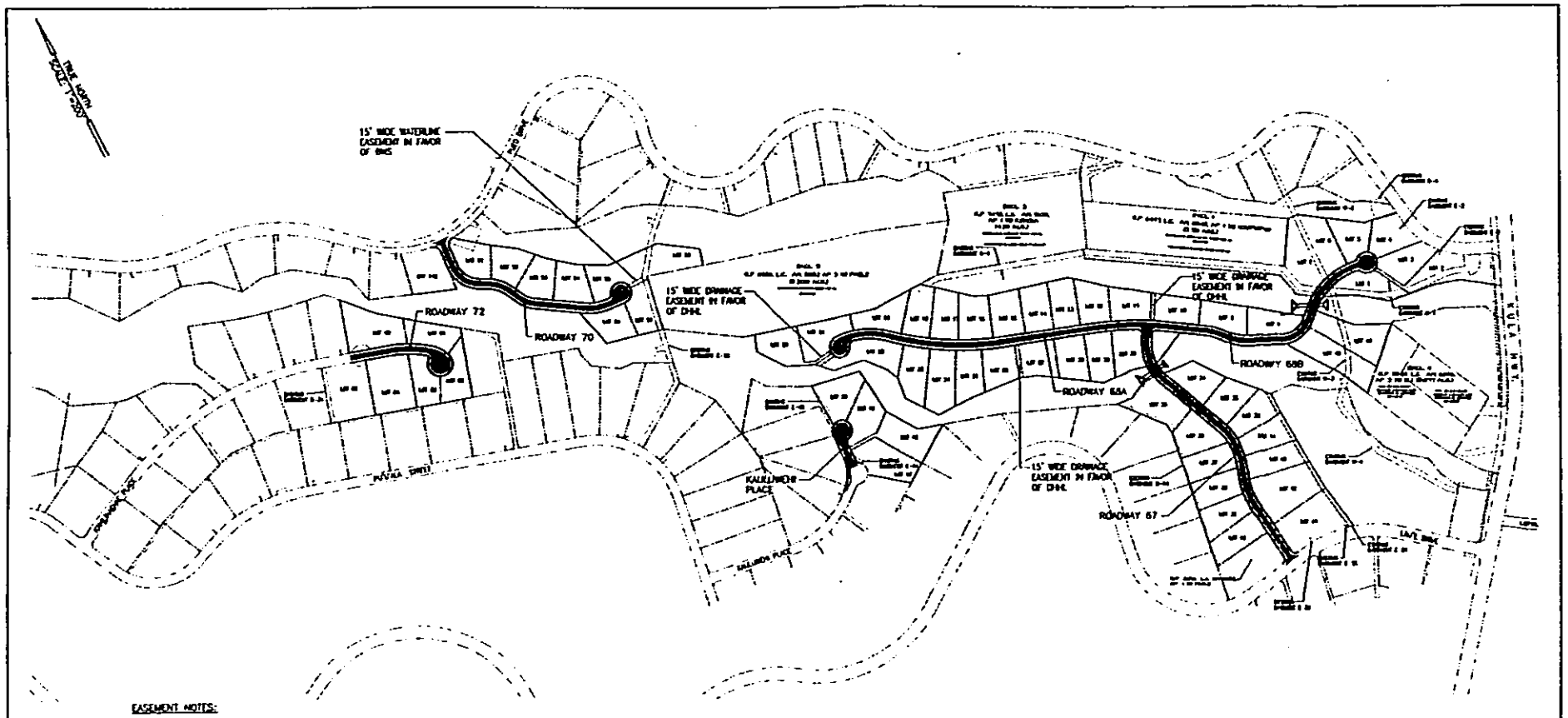
   PROPOSED WAIOHULI HIKINA SUBDIVISION WILL AFFECT LOTS 294, 295, 345, & 349 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   REF.: KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

SCHEMATIC PLAT MAP



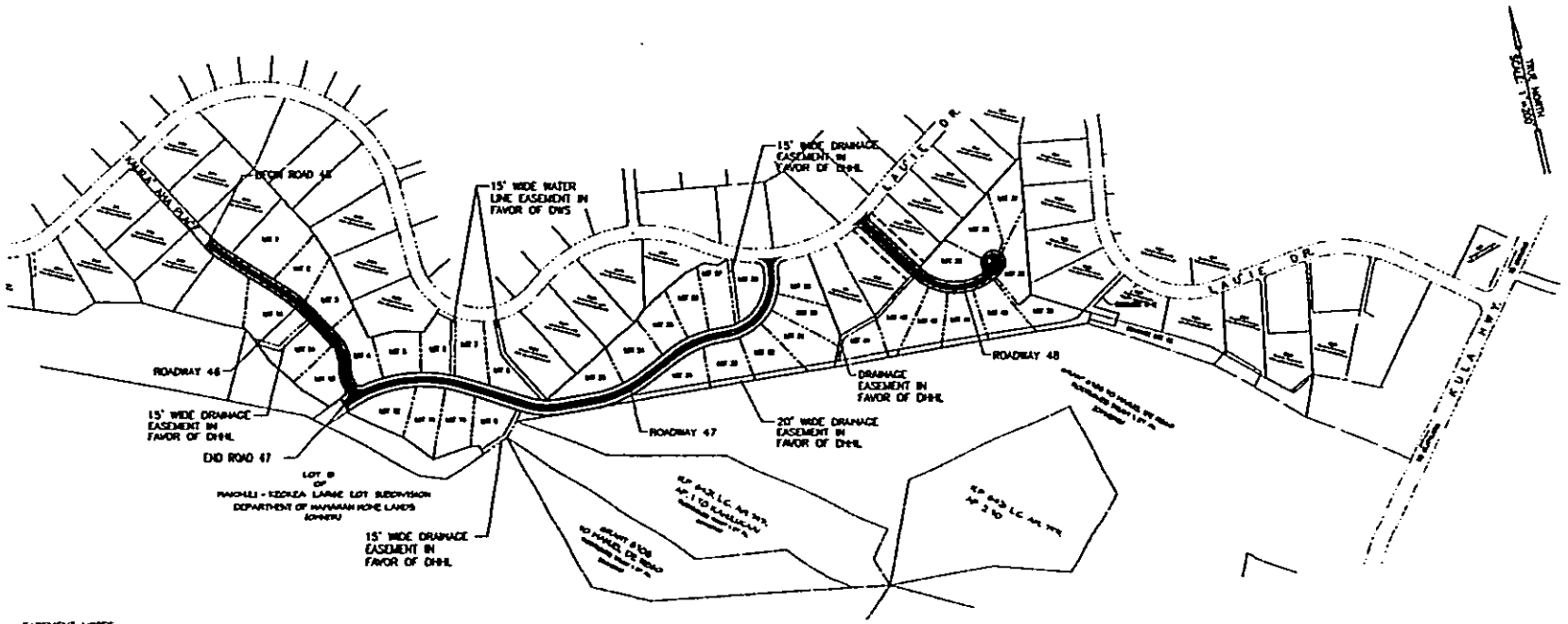
EASEMENT NOTES:

1. ALL PROPOSED ROADS ARE IN FAVOR OF COUNTY (RDS "67", "68A", "68B", "70", "72" AND KAULUWEHI PLACE)
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY CO. OR COUNTY.
3. WATERLINE & ACCESS EASEMENTS IN FAVOR OF BWS ARE 20 FT. WIDTH, UNLESS NOTED OTHER-WISE.
4. DRAINAGE & MAINTENANCE EASEMENTS AT ROAD CULVERT CROSSINGS ARE IN FAVOR OF COUNTY. SEE ROAD PLAN/PROFILE FOR DIMENSIONS

HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS/SURVEYORS • HONOLULU, HAWAII

WAIOHULI UKA SUBDIVISION
GENERAL PLAN



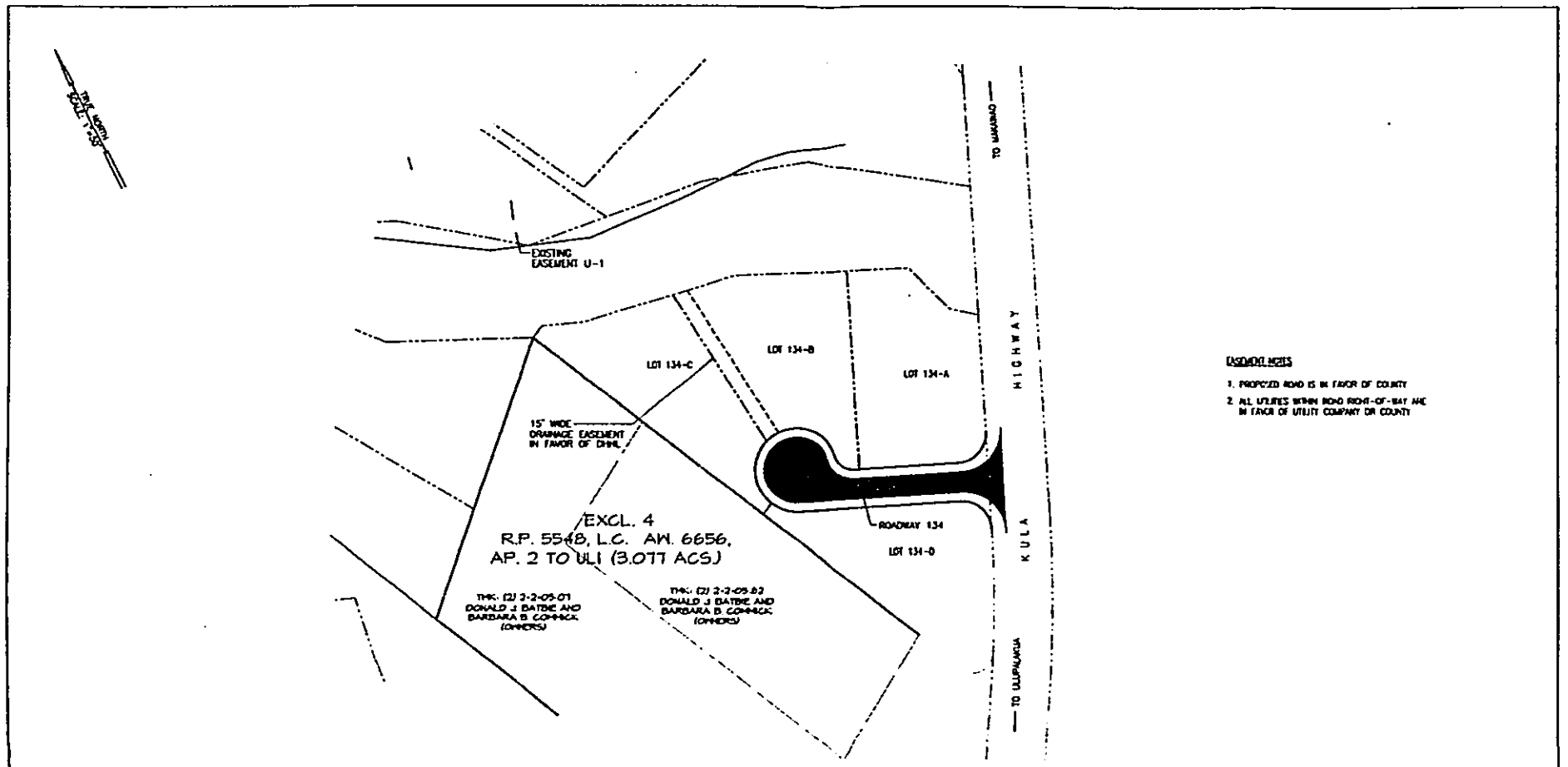
EASEMENT NOTES:

1. ALL PROPOSED ROADS ARE IN FAVOR OF COUNTY. (RDS. "46", "47" AND "48"
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY CO. OR COUNTY.
3. ALL PRESSURE REDUCING STATIONS ARE IN FAVOR OF DWS.
4. WATERLINE & ACCESS EASEMENTS IN FAVOR OF DWS ARE 20 FT. WIDTH, UNLESS NOTED OTHERWISE.
5. DRAINAGE & MAINTENANCE EASEMENTS AT ROAD CULVERT CROSSINGS ARE IN FAVOR OF COUNTY. SEE ROAD PLAN/PROFILE FOR DIMENSIONS
6. DRAINAGE EASEMENTS IN FAVOR OF LESSEES ARE 10 FT. WIDTH, UNLESS NOTED OTHERWISE.
7. OTHER DRAINAGE EASEMENTS ARE 15 FT. WIDTH.

HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS/SURVEYORS • HONOLULU, HAWAII

WAIOHULI HIKINA SUBDIVISION GENERAL PLAN



EASEMENT NOTES

1. PROPOSED ROAD IS IN FAVOR OF COUNTY
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY COMPANY OR COUNTY

HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS/SURVEYORS • HONOLULU/MAUI

WAIOHULI LOT 134 SUBDIVISION GENERAL PLAN

Appendix B

Department of Hawaiian Home Lands Correspondence

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

December 20, 2002

The Honorable David C. Goode
Department of Public Works and Waste Management
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Goode:

Subject: Waiohuli Lot 134 Subdivision: Proposed Subdivision
of Parcel 134 of File Plan 2321
Tax Map Key: (2) 2-2-02: Por. 56
Waiohuli, Kula, Makawao, Maui, Hawaii

This letter authorizes Austin, Tsutsumi and Associates, Inc. to act as the agent on behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), in the processing of the subject parcels for preliminary and final subdivision approval.

DHHL is developing this subdivision under the Hawaiian Homes Commission Act, 1920, as amended (Act). As allowed by the Act, DHHL is exempting itself from various State of Hawaii and County of Maui subdivision development-related statutes and regulations for the Waiohuli Lot 134 Subdivision.

The declaration of exemptions below is intended to facilitate the granting of final subdivision approval upon completion of the subdivision improvements and to minimize the cost of the improvements.

These exemptions will not substantially endanger human health or safety and are in the public's interest. Compliance with those sections of the Maui County Code, that this project is being exempted, from would produce serious hardship without equal or greater benefit to the lessees or the public.

Exemptions from the following State of Hawaii and County of Maui subdivision statutes and regulations are being declared:

1. State Land Use Commission District Boundary Amendment
   - Chapter 205, Hawaii Revised Statutes, as Amended
   - State Land Use Commission Rules.

2. Title 19, Maui County Code, 1980, as Amended
   - Chapter 19.510 Application and Procedures
   - Section 19.510.040 Change of Zoning.

3. Community Plan Amendment
   - Maui County Code, Chapter 2.80
   - Maui County Charter, Section 8-8.4 and 8-8.5.

4. Tax Clearance
   - Maui County Code 18.12.040, Submittal of a tax clearance certificate by the subdivider.

5. Maui County Code Section 18.12.060
   - Filing for extensions from the time of tentative subdivision approval to completion of the improvements and final subdivision approval.

6. Subdivision Filing Fees
   - Maui County Code 18.24.010, Filing Fees for subdivision and plan review.

7. Subdivision Design Standards
   - Maui County Code 18.20.140, Underground utilities. Electric power lines will be installed overhead instead.

8. Subdivision Design Standards
   - Maui County Code 18.16.130. This project will be exempt from the requirement that cul-de-sacs measure not more than five hundred feet
   - Section 19.04.040, Minimum distance between flag lots. Flag lots for this project shall be permitted to be back-to-back.

9. Section 12.24A.070. This project will be exempt from the requirements of street tree planting.

The subdivision is situated on lands zoned AG Zone 1 (County of Maui, Maui County Code Section 19.30A). However, the subdivision shall be designed and reviewed in accordance with Rural standards of the Maui County Code, Section 19.29.020. Minimum lot areas shall be 0.5 acre.

Should you have any questions, please call Gerald Lee of our Land Development Division at 587-6447 or I can be reached at 586-3801.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: County of Maui, Land Use and Codes Administration
Austin, Tsutsumi & Associates, Inc.

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

December 23, 2002

The Honorable David C. Goode
Department of Public Works and Waste Management
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Goode:

Subject: Waiohuli Hikina Subdivision: Proposed Subdivision of Parcels 294, 295, 345 and 345 of File Plan 2321
Tax Map Keys: Tax Map Key: (2) 2-2-02: Por. 56
Waiohuli, Kula, Makawao, Maui, Hawaii

This letter authorizes Austin, Tsutsumi and Associates, Inc. to act as the agent on behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), in the processing of the subject parcels for preliminary and final subdivision approval.

DHHL is developing this subdivision under the Hawaiian Homes Commission Act, 1920, as amended (Act). As allowed by the Act, DHHL is exempting itself from various State of Hawaii and County of Maui subdivision development-related statutes and regulations for the Waiohuli Hikina Subdivision.

The declaration of exemptions below is intended to facilitate the granting of final subdivision approval upon completion of the subdivision improvements and to minimize the cost of the improvements..

These exemptions will not substantially endanger human health or safety and are in the public's interest. Compliance with those sections of the Maui County Code, that this project is being exempted, from would produce serious hardship without equal or greater benefit to the lessees or the public.

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   - Chapter 205, Hawaii Revised Statutes, as Amended
   - State Land Use Commission Rules.

2. Title 19, Maui County Code, 1980, as Amended
   - Chapter 19.510 Application and Procedures
   - Section 19.510.040 Change of Zoning.

3. Community Plan Amendment
   - Maui County Code, Chapter 2.80
   - Maui County Charter, Section 8-8.4 and 8-8.5.

4. Tax Clearance
   - Maui County Code 18.12.040, Submittal of a tax clearance certificate by the subdivider.

5. Maui County Code Section 18.12.060
   - Filing for extensions from the time of tentative subdivision approval to completion of the improvements and final subdivision approval.

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   - Maui County Code 18.24.010, Filing Fees for subdivision and plan review.

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   - Maui County Code 18.20.140, Underground utilities. Electric power lines will be installed overhead instead.

8. Subdivision Design Standards
   - Maui County Code 18.16.130. This project will be exempt from the requirement that cul-de-sacs measure not more than five hundred feet
   - Section 19.04.040, Minimum distance between flag lots. Flag lots for this project shall be permitted to be back-to-back.

9. Section 12.24A.070. This project will be exempt from the requirements of street tree planting.

The subdivision is situated on lands zoned AG Zone 1 (County of Maui, Maui County Code Section 19.30A). However, the subdivision shall be designed and reviewed in accordance with Rural standards of the Maui County Code, Section 19.29.020. Minimum lot areas shall be 0.5 acre.

Should you have any questions, please call Gerald Lee of our Land Development Division at 587-6447 or I can be reached at 586-3801.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: County of Maui, Land Use and Codes Administration
Austin, Tsutsumi & Associates, Inc.

LINDA LINGLE
GOVERNOR
STATE OF HAWAII

RAYNARD C. SOON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAII 96805

December 23, 2002

The Honorable David C. Goode
Department of Public Works and Waste Management
250 South High Street
Wailuku, Hawaii 96793

Dear Mr. Goode:

Subject: Waiohuli Uka Subdivision: Proposed Subdivision of Parcels 112, 137, 193, 194, 195, 343, and 346 of File Plan 2321, Tax Map Key: (2) 2-2-02: Por. 56 Waiohuli, Kula, Makawao, Maui, Hawaii

This letter authorizes Austin, Tsutsumi and Associates, Inc. to act as the agent on behalf of the State of Hawaii, Department of Hawaiian Home Lands (DHHL), in the processing of the subject parcels for preliminary and final subdivision approval.

DHHL is developing this subdivision under the Hawaiian Homes Commission Act, 1920, as amended (Act). As allowed by the Act, DHHL is exempting itself from various State of Hawaii and County of Maui subdivision development-related statutes and regulations for the Waiohuli Uka Subdivision.

The declaration of exemptions below is intended to facilitate the granting of final subdivision approval upon completion of the subdivision improvements and to minimize the cost of the improvements.

These exemptions will not substantially endanger human health or safety and are in the public's interest. Compliance with those sections of the Maui County Code, that this project is being exempted, from would produce serious hardship without equal or greater benefit to the lessees or the public.

Exemptions from the following State of Hawaii and County of Maui subdivision statutes and regulations are being declared:

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   - Chapter 205, Hawaii Revised Statutes, as Amended
   - State Land Use Commission Rules.

2. Title 19, Maui County Code, 1980, as Amended
   - Chapter 19.510 Application and Procedures
   - Section 19.510.040 Change of Zoning.

3. Community Plan Amendment
   - Maui County Code, Chapter 2.80
   - Maui County Charter, Section 8-8.4 and 8-8.5.

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   - Maui County Code 18.20.140, Underground utilities. Electric power lines will be installed overhead instead.

8. Subdivision Design Standards
   - Maui County Code 18.16.130. This project will be exempt from the requirements that cul-de-sacs measure not more than five hundred feet and serve no more than 20 lots
   - Section 19.04.040, Minimum distance between flag lots. Flag lots for this project shall be permitted to be back-to-back.

9. Section 12.24A.070. This project will be exempt from the requirements of street tree planting.

The subdivision is situated on lands zoned AG Zone 1 (County of Maui, Maui County Code Section 19.30A). However, the subdivision shall be designed and reviewed in accordance with Rural standards of the Maui County Code, Section 19.29.020. Minimum lot areas shall be 0.5 acre.

Should you have any questions, please call Gerald Lee of our Land Development Division at 587-6447 or I can be reached at 586-3801.

Aloha,

Raynard C. Soon, Chairman
Hawaiian Homes Commission

c: County of Maui, Land Use and Codes Administration
Austin, Tsutsumi & Associates, Inc.

Appendix C

Letter Dated July 24, 1995 from State Historic Preservation Division

JOHN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

JUL 31 1995

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

July 24, 1995

LOG NO: 15140
DOC NO: 9507RC41

Ms. Gwen Ohashi
Acting Director
Land Use & Codes Administration
Department of Public Works
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Ms. Ohashi:

SUBJECT: DHHL Kula Residential Lots, Unit 1 -- Subdivision of Lot A
Waiohuli, Kula, Maui
TMK: 2-2-02: 56

Thank you for the opportunity to respond to the subdivision. Our office has been working with the Department of Hawaiian Home Lands (DHHL) and with their planner (Munekiyo & Arakawa) to adequately handle historic preservation concerns for this subdivision.

42 significant sites are present within Lot A. For those 42, two different kinds of mitigation approches have been agreed upon. However, all sites are to be protected for the time being, with different sized buffer zones. We are recommending two conditions to cover the protection of these sites. These are fairly standard conditions, with some additional wording to cover the fact that parcels will be awarded out to individuals by DHHL.

33 sites are significant solely for their information content. These sites can be archaeologically data recovered and then destroyed, or they can be preserved, or they can be temporarily preserved until data recovery is done. DHHL may decide to have these sites data recovered before awarding, or they might have these decisions be made by the individual awardees based on how they plan to use their lots. Currently, they must be considered to be slated for preservation until data recovery occurs. At this point, we have recommended that 15 foot buffers be placed around these sites. They need only small buffer zones around their edges; to protect the site's information. For these 33 sites, we recommend the following condition, to ensure their protection:

1. 33 sites have archaeological data recovery as the agreed upon mitigation measure. These sites must be protected until data recovery occurs. Prior to any data recovery work, an archaeological data recovery plan (scope of work) must be approved by the State Historic Preservation Division. The suceessful execution of this plan must be verified in writing by that Division to the Department of Hawaiian Home Lands. Until these sites are data

recovered, 15 foot buffers shall be placed around these sites -- as interim protection measures. Awardees shall be notified by DHHL of the presence of any of these sites that have not yet been data recovered that are on their plots, and the mitigation concerns shall be explained to them. Prior to any land altering construction, the buffers shall be marked -- with an archaeologist verifying the markers are correctly placed.

9 sites are recommended for preservation, some intended for interpretation. The sites consist of house sites, shrines, burials, and one heiau. These sites need larger buffer zones to allow the inclusion of some of the surrounding terrain to preserve the visual and physical context of the site. And they will eventually need long-range preservation plans, with interpretive elements in some cases. Buffer zones still need to be fixed for 6 of these sites, and we are working with the planners on alternatives. Awardees also need to be aware of these sites, if they are on their land, and interim protection measures are needed. Eventually, interpretative/preservation plans will be needed, and our Division will probably assist DHHL in preparing these plans. At this time, we recommend the following condition to ensure protection of these sites:

2. 9 sites shall be preserved (W-11,-27, -28, -30, -32, -35, -36, -45, -90 as identified in the PHRI archaeological survey) some for interpretive purposes. DHHL shall establish buffers around these sites which are acceptable to the State Historic Preservation Division. Preservation plans for these sites shall be developed, and the plans must be approved by the State Historic Preservation Division prior to their implementation. Awardees shall be notified by DHHL of the presence of any of these sites that are on their plots, and the preservation concerns shall be explained to them. Prior to any land altering construction in the vicinity of any of these sites, the buffers shall be marked -- with an archaeologist verifying the markers are correctly placed.

If your department or DHHL finds some of the above wording to have problems, please let us know, and acceptable alternatives can easily be worked out. The above conditions however, should ensure that the subdivision will have "no adverse effect" on the significant historic sites.

Please contact Dr. Sara Collins (587-0013) if you have any questions.

Aloha,

Don Hibbard, Administrator

RC:jen

c: Planning Office, Department of Hawaiian Home Lands
Glenn Tadaki, Munekiyo & Arakawa, Inc.

Appendix C-1

Letter Dated March 23, 2000 from State Historic Preservation Division

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES
ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

March 23, 2000

Mr. Michael Dega
Scientific Consultant Services
711 Kapiolani Blvd., Suite 777
Honolulu, Hawaii 96813

LOG NO: 25123
DOC NO: 0003RC56

Dear Mr. Dega:

SUBJECT: Review – Revised Waiohuli Data Recovery Report (DHHL Residential Lots Unit 1)
Waiohuli, Kula District, Maui

This letter reviews this revised report which was submitted on December 21, 1999 (Dunn et al. 1999. Archaeological Data Recovery of the DHHL Kula Residential Lots Unit 1 of Waiohuli Subdivision ... SCS ms.). The revisions were made to address our review letter of October 20, 1999 (Log: 24,090; Doc: 9907RC40).

This is a vastly improved report which focuses clearly on the research questions.

One question was to try to clarify the nature and age of the agricultural sites in upland Waiohuli. Kolb et al. (1997) had found terraces across soil-filled swales and small gardens near houses on rocky ridges and evidence that agriculture was beginning in the A.D. 1200s-1400 in association with permanent habitation of the area. The PHRI survey of your project area had mentioned agricultural features being present, but studied them only briefly. Your study successfully identified micro-topography zones with swale-slope and high-low elevation differences and identified agricultural feature associations (e.g., pp. 12-13). Could you please provide a map identifying the topographic zones within the project area and the feature types found in the specific areas, so the field identified evidence is presented from which you make your generalizations in the text? While you note that unfortunately no agricultural features (e.g., terraces) were dated, you have clearly found and dated agricultural soils (with charcoal flecking) back to the late 1200s-1400, which is evidence supportive of Kolb et al.'s findings. Thus, we find this question successfully addressed, with the understanding that the map will be sent.

The second question was to look at pig and dog consumption patterns in permanent housing of identified social ranks. Kolb et al found pig and dog remains to be slightly more common in higher ranking commoner or low chiefs' habitations versus commoner habitations – as an overall pattern. However, when looking at individual house sites, there was tremendous variation with some higher ranking houses having no pig or dog and some commoner houses having a great deal. Your study was to add to this data base by determining the social rank of the houses in your project area and conducting limited excavation to recover pig and dog

remains. [The social rank analysis is actually part of this question, not the population growth question.] You conclude that the 10 houses studied were all of the same social rank, equivalent to the commoner houses identified by Kolb et al. (p. 102), and you clearly present the pig and dog information (p. 101 table). Basically, the same pattern appears. Only a few houses had pig and dog, and very little was found in your study area. We have only one request on this question. While your social ranking analysis seems reasonable, could you provide a table presenting the data which support your ranking conclusions. This could note Kolb et al.'s traits for the lower and higher social ranking clusters and then present your data. For example, traits might be number of houses per site, size of structures, whatever. This question is adequately addressed, with the understanding such a table is submitted.

The last research question was to add your dated house sites to the Waiohuli data base to evaluate population growth in Waiohuli. Kolb et al. Had found permanent habitation beginning in the 1200s-1400, with a marked increase in the 1400s-1500s, continuing to increase in the 1600s-170ss. As you note, test unit locations and profiling problems and a lack of charcoal samples prevented dating the range of occupation for all the permanent habitations. However, your findings do indicate these houses were occupied no earlier than the 1400s, which would add to the overall Waiohuli pattern of marked population increase after 1400. We find this question to be successfully addressed.

In sum, we find this revised data recovery report to be acceptable, with the understanding that your firm will submit to both our Honolulu and Maui offices the map of agricultural features/topography and a table on your social ranking analyses for incorporation into the report. Please also be sure that DHHL's Planning Office receives a copy of the final report.

If the artifacts and other archaeological material are at your firm's offices, could you please arrange for their transport to our Maui office. We are holding DHHL's collections for them at this time. Archiving the material on Maui will conclude the data recovery project.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

RC:jen

c: Joe Chu, Planning Office, DHHL
Patty Conte, SHPD Maui Office

Appendix C-2

Letter Dated February 4, 2002 from State Historic Preservation Division

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

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

February 4, 2002

Mr. Gerald Lee
Department of Hawaiian Homelands
State of Hawaii
Suite 2000
1099 Alakea Street
Honolulu, Hawaii 96813

LOG NO: 29082
DOC NO: 0201RC45

Dear Mr. Lee:

SUBJECT: **Review of Preservation Plan for 4 Historic Sites – Waiohuli Residential Lots, Unit 1 (DHHL) Waiohuli, Kula moku, Maui TMK: 2-2-02: 56**

This letter reviews this plan which our staff received on January 29, 2002 (Dega 2002. Preservation Plan for DHHL Kula Residential Lots, Unit 1 of Waiohuli Subdivision, Waiohuli Ahupua'a, Kula District, Maui Island, Hawai'i. SCS ms.). (Our Branch Chief for Archaeology, Dr. Ross Cordy, had received a preliminary draft from Dr. Michael Dega of SCS and informally sent comments to Dr. Dega on it.) We have also just received a fax from Dr. Dega providing information on consultation with local Hawaiian groups on this plan.

This plan covers preservation measures for four historic sites – one heiau (site 1039/2041, Kaumeheiwa Heiau), two archaeological structures that are either small heiau or permanent habitations, and a small shrine.

Buffer zones for these sites were fixed a number of years ago, prior to the initial road work in the development area. Kaumeheiwa Heiau is being set aside within one entire lot (Lot 77, F.P. 91), and site 2042 is in a proposed park lot which will have considerable open space. The other two sites have reasonable buffer zones in our opinion.

The preservation measures proposed in this plan seem acceptable and thorough to us, with one clarification. Landscaping with native plants within the buffer (outside the structures) may be acceptable (certainly along the outer edge of the buffer), but any future planting proposals will need to be submitted to our office for approval, as a safety check to ensure no damage to the site, subsurface deposits, or the view-lines to the sites.

We are glad to see that DHHL was willing to put up signs at each site, to minimally inform people that these are historic sites and need protection. This greatly helps protect sites

from accidental damage. We are also pleased to see that interpretive signage is also being included at the two more accessible sites (Kaumeheiwa Heiau and site 2042), as this will enhance the homesteaders' and our local public's understanding of these sites and the history of the area. Dr. Cordy provided ideas for text to SCS, and although they did not need to use the examples he gave, we note that his suggested text is being used.

The plan is acceptable to our office. The consultation information indicates that the local Hawaiian groups that were consulted and OHA also found the plan acceptable. Thus, this preservation plan is acceptable.

The above information should be sufficient to conclude your applications with the County. Once the signs and permanent elements of the plan are put in place, please contact our office, so we can make a fieldcheck to verify successful execution. Once that occurs the historic preservation review process will be concluded.

You mentioned that you are preparing to finalize the subdivision map with the County. We assume that the map in the preservation plan is a draft of that map. We would like to make one comment on the map. The caption for sites 2042 and 2043 says "ceremonial site". The information on these sites actually only concludes that each is either a small heiau or a habitation. It can be misleading to simply say "ceremonial". We suggest that the wording "small heiau or habitation" be used for the captions of those two sites on the subdivision and any other overall maps.

If you have any questions, please feel free to contact our Branch Chief for Archaeology, Ross Cordy, at 692-8025.

Aloha,

Don Hibbard, Administrator
State Historic Preservation Division

RC:jk

c: Public Works Department, County of Maui
Dr. Michael Dega, SCS
Pua Aiu, OHA

Appendix C-3

Letter Dated April 29, 2003 from State Historic Preservation Division

LINDA LINGLE
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

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

PETER T. YOUNG
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

DAN DAVIDSON
DEPUTY DIRECTOR - LAND

ERNEST Y.W. LAU
DEPUTY DIRECTOR - WATER
COMMISSION ON WATER RESOURCE MANAGEMENT

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

April 29, 2003

Michael Dega, Ph.D.
Scientific Consultant Services
711 Kapi'olani Boulevard, Suite 1475
Honolulu, Hawai'i 96713

LOG NO: 2003.0394
DOC NO: 0304KK06

Dear Dr. Dega:

Subject: **DLNR approval of burial treatment plan for DHHL Kula Residential Lots Unit 1 of the Waiohuli Subdivision, Waiohuli, Kula, Island of Maui [TMK: (2) 2-2-002:056]**

At its regular meeting held on February 28, 2002, the Maui / Lāna'i Islands Burial Council (MLIBC) voted unanimously to recommend approval of the burial treatment plan for DHHL Kula Residential Lots Unit 1 of the Waiohuli Subdivision, noting that three revisions that have been suggested by the council be incorporated within the plan and that a final draft of the plan be submitted to the council for verification that the revisions have been made.

Vice-Chair Dana Nāone Hall, as authorized by the council, has since verified that the suggested revisions have been made.

The department concurs with the position of the MLIBC and finds the aforementioned burial treatment plan acceptable.

If you have any questions, please call Kana'i Kapeliela, Burial Sites Program Cultural Specialist, at (808) 692-8037.

Sincerely,

P. Holly McElDowney

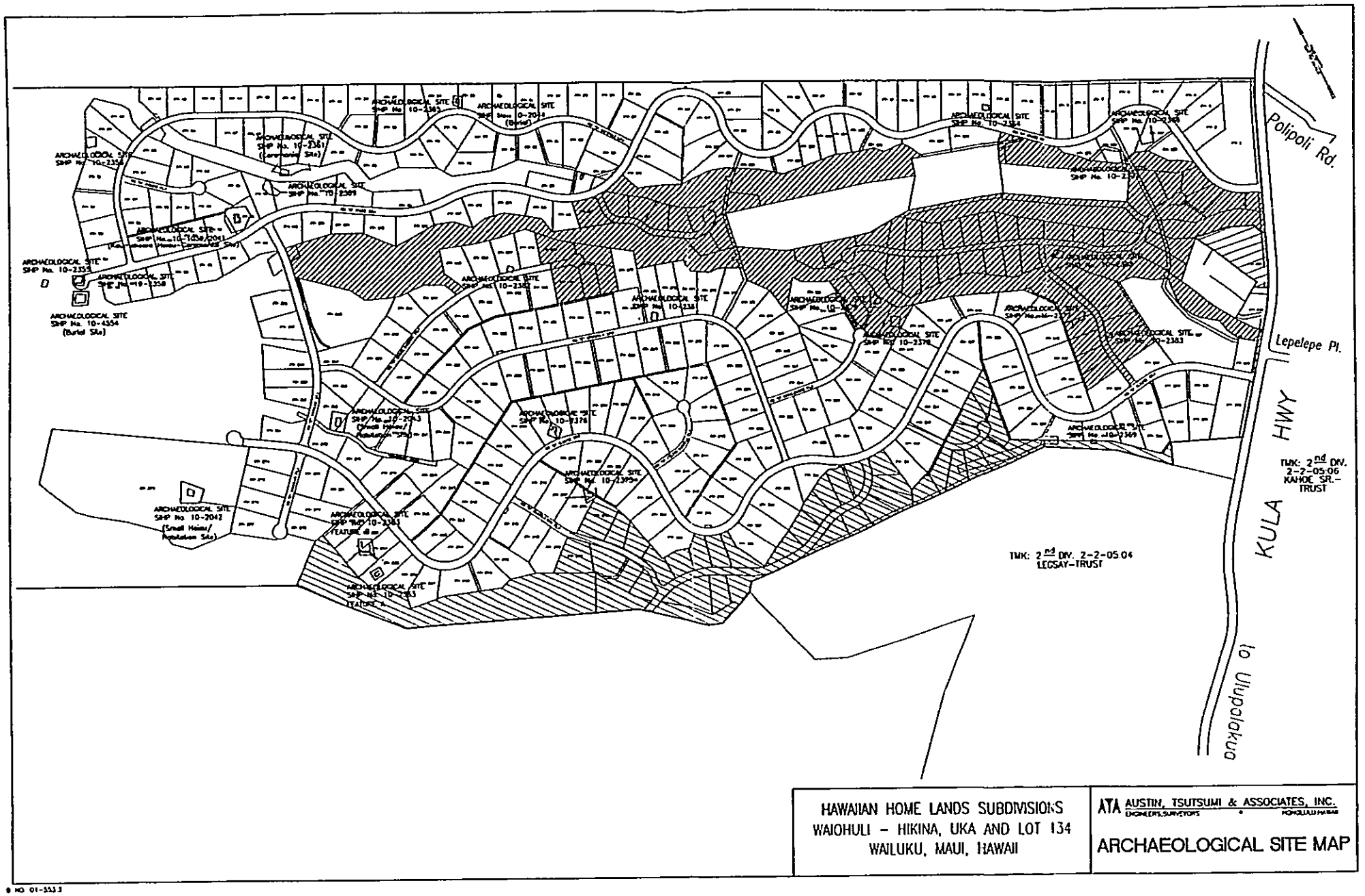
P. HOLLY MCELDOWNEY, Acting Administrator
State Historic Preservation Division

KK

c: Charles Maxwell, Chair, MLIBC
Dana Nāone Hall, Vice-Chair, MLIBC
Dr. Melissa Kirkendall, SHPD Maui Island Archaeologist
Cathleen Dagher, SHPD Assistant Maui Island Archaeologist

Appendix C-4

Archaeological Site Map


Polipoli Rd.
Lepelepe Pl.
KULA HWY
TMK: 2nd DIV. 2-2-05:06
KAHOE SR.-TRUST
TMK: 2nd DIV. 2-2-05:04
LEGSAY-TRUST
To Ulupalakua
HAWAIIAN HOME LANDS SUBDIVISION
WAIOHULI - HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII
ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS
ARCHAEOLOGICAL SITE MAP

Appendix D

Preliminary Engineering Report

PRELIMINARY ENGINEERING REPORT FOR THE HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI (WAIOHULI HIKINA, WAIOHULI UKA AND WAIOHULI LOT 134 SUBDIVISION)

Tax Map Key: 2nd Div. 2-2-002:056

Prepared for

State of Hawaii
Department of Hawaiian Home Lands

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

December 2003
Revised March 2, 2004

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TAX MAP KEY: 2nd DIV. 2-2-02:56

I. INTRODUCTION

The purpose of this report is to summarize the basis of design to be used in the preparation of the construction plans for the proposed rural subdivisions within the existing Kula Residence Lots, Unit 1 Subdivision. A description of the proposed project, including the existing site conditions and utilities, and the proposed improvements is also provided in this report.

II. PROPOSED PROJECT

A. Project Locations

The proposed project is located in the Waiohuli area of the Kula District on the island of Maui (Exhibit 1-inset). The project site is on the west side of Kula Highway within the Kula Residence Lots, Unit 1 Subdivision. The total parcel area of the existing Kula Residence Lots, Unit 1 Subdivision, designated by Tax Map Key No. 2-2-02:56 encompasses 689.21 acres (Exhibit 1). The proposed developments will subdivide approximately 122 acres. The proposed subdivisions will be developed under the rural zone designation, as described in the Hawaii Revised Statutes, Section 205 and be consistent with the existing Kula Residence Lots, Unit 1 Subdivision. The existing Kula Residence Lots, Unit 1 Subdivision is referenced by LUCA File No. 2.2305 and the proposed

subdivisions are referenced by Development Services Administration (DSA) Subdivision File No. 2.2761 (Waiohuli Lot 134 Subdivision), 2.2762 (Waiohuli Uka Subdivision) and 2.2763 (Waiohuli Hikina Subdivision).

B. Land Ownership

The land owner and developer for this project is the State of Hawaii, Department of Hawaiian Home Lands (DHHL).

Five (5) privately-owned kuleana parcels (i.e. Exclusions 1-4) are located within the project site and are excluded from the proposed development. Access to these parcels will be provided, maintained, and constructed with project improvements.

C. Project Description

The proposed rural subdivisions are within the existing Kula Residence Lots, Unit 1 Subdivision and will consist of 99 total new lots with new roadways and related infrastructure. The 99 lots will be developed as three (3) Hawaiian Home Lands Subdivisions: Waiohuli Hikina, Waiohuli Uka, and Waiohuli Lot 134 subdivisions. Individual lot sizes range from one-half acre to one acre (i.e. Rural District RU – 0.5). See schematic plat map (Exhibit 2).

The proposed Waiohuli Hikina Subdivision will consolidate Lots 294, 295, 345 and 349 (37.30 acres) of the existing Kula Residence Lots, Unit 1 Subdivision and will subdivide them into 36 new lots.

The proposed Waiohuli Uka Subdivision will consolidate Lots 112, 137, 193, 194, 195, 343 and 346 (81.92 acres) and will subdivide them into 59 new lots.

The proposed Waiohuli Lot 134 Subdivision will subdivide Lot 134 (2.47 acres) of the existing Kula Residence Lots, Unit 1 Subdivision into four (4) new lots.

III. EXISTING SITE CONDITIONS

A. Topography and Soil Conditions

The project site slopes down from Kula Highway in a northwesterly direction at an average of 10 to 15 percent. The elevation ranges from 3,000 feet above Mean Sea Level (MSL) at Kula Highway to 1,800 feet above MSL at the northwest end of the site. The upper regions of the site are overgrown with trees, while the lower section (below 2250 feet MSL) is grassy, with lantana and cacti.

There are two (2) types of soil classifications, as identified by the U.S. Department of Agriculture (USDA) Soil Conservation Service "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii", found on the project site. In the higher elevations, near Kula Highway, the soil series for the general area is Kula cobbly loam (KxaD), with 12 to 20 percent slopes. This soil is generally found on the intermediate uplands on the island of Maui. Permeability is moderately rapid. Runoff is medium, and the erosion hazard is moderate. At the lower elevations of the site, the soil classification is described as Kamaole very stony silt loam (KGKC), 3 to 15 percent slopes. This well-drained soil is found on the uplands of Maui. Permeability is moderate. Runoff is slow to medium, and the erosion hazard is slight to moderate.

A soils investigation will be conducted and a report will be prepared by Ernest K. Hirata and Associates, Inc.

B. Climate and Rainfall

The Kula area is generally sunny and cool throughout the year with temperatures averaging 75 degrees. The mean annual rainfall amounts range from 25 to 40 inches and is well distributed throughout the year. The Kula area has a climate typical of areas in the Hawaiian Islands exposed to prevailing northeasterly tradewinds. During the rainy season, October to April, the winds may vary with occasional strong, southerly winds accompanying cyclonic "Kona" storms.

IV. EXISTING SITE CONDITIONS AND UTILITIES

Existing utilities include drainage, water, overhead electrical systems, and an underground telecommunication system to be installed independently of this project by Sandwich Isles Communications (SIC). Individual wastewater systems (IWS) will be installed by the individual lessees for sewer purposes.

Generally, existing utilities have been installed within the proposed roadway Right-of-Way. Drainage and water easements in favor of Maui County and overhead utility easements in favor of Maui Electric Company (MECO) have been designated for portions of the facilities that are outside of the proposed roadway right-of-way. Drainage culverts with inlet and outlet structures were installed under sections of the roadway to accommodate drainage throughout the project site. Individual wastewater systems (IWS) within each lot are the responsibility of the individual lessee.

A. Existing Drainage System

The offsite and onsite storm water runoff flows in a northwesterly direction across the project site. On-site gullies and natural drainageways convey the runoff towards two (2) large existing gulches bordering the site, Kaakaulua Gulch to the north and Waiohuli Gulch to the south. Downstream of the project site, Kaakaulau Gulch and Waiohuli Gulch discharge runoff into Kulanihakoi Gulch and Waipuilani Gulch, respectively. See Offsite Hydrology Map (Exhibit 3). Ultimately, runoff from the gulches discharges into the Pacific Ocean in the Kihei area.

The existing on-site drainage system consists of paved swales, drain inlets, manholes, and drainage culverts along the roadways, lined interceptor ditches along property lines, and outlet structures along the gulches.

The existing on-site drainage systems within the road right-of-ways are maintained by Maui County, including areas upstream and downstream of each road culvert crossing within the drainageways.

The existing drainage systems outside of the road right-of-ways, including lined interceptor ditches and outlet structures, are maintained by the Department of Hawaiian Home Lands (DHHL).

B. Existing Water System (Department of Water Supply-DWS)

The Lower Kula Water System is the primary source for the existing on-site water system (i.e., Service Zones 2, 3, and 4). Per the "Water Credits Agreement" (dated December 9, 1997) entered into and executed by the Department of Water Supply (DWS) and DHHL, the DWS has committed 500,000 gallons per day for developments at Waiohuli and Keokea from the Lower Kula Water Treatment Plant at Piiholo.

The Upper Kula Water System is the primary source for the existing off-site 6-inch and 8-inch waterlines along Kula Highway, fronting the project site, which services lots within Service Zone 1.

The existing water system is comprised of one (1) offsite Service Zone (i.e. Service Zone 1) and three (3) onsite Service Zones (i.e. Service Zones 2, 3, & 4) (Exhibit 4). There are three (3) existing on-site reservoir tanks: two (2)-0.2 mg and one (1)-0.5 mg. Water from the existing Lower Kula Water System flows into the 0.5 mg tank in Service Zone 3 via an 18-inch transmission line from Naalae Road. Water is either pumped up to the 0.2 mg Zone 2 tank or flows to the 0.2 mg Zone 4 tank. Service Zone 1 is connected to the Upper Kula Water System. Service Zone 2 consists of a 0.2 mg reservoir tank with pipelines ranging in diameter from 6 to 12 inches. Onsite Service Zone 3 consists of a 0.5 mg reservoir tank with pipelines ranging in diameter from 6 to 12 inches. Onsite Service Zone 4 consists of a 0.2 mg reservoir tank with pipelines ranging in diameter from 6 to 12 inches. The existing onsite service levels were designed to provide water to the following elevation ranges:

Service Zone 1 (3195 feet MSL):	Elevation 3095 feet to 2915 feet
Service Zone 2 (3015 feet MSL):	Elevation 2915 feet to 2670 feet
Service Zone 3 (2770 feet MSL):	Elevation 2670 feet to 2270 feet
Service Zone 4 (2370 feet MSL):	Elevation 2270 feet to 2000 feet

Reference:

1 "Water Credits Agreement" between DWS & DHHL, dated December 9, 1997.

2 "Water Master Plan for Waiohuli Water Storage System and Lower Kula Waterline Improvement" by Tanaka Engineers and Clifford Jamile P.E. October 1996.

3 Water Master Plan for Keokea Farm Lots, Unit 1 by SSFM International, Inc., dated and accepted by DWS, October 2002.

4 "Construction Plans for Lower Kula and Waiohuli Water System Improvements DWS SD No. 95-49.

5 "Construction Plans for Kula Residence Lots, Unit 1 – LUCA File no. 2.2305 / DWS File No. SD95-49.

The Kula Residence Lots, Unit 1 subdivision has a total of 321 residential lots. There are 13 residential lots in Service Zone 1, 48 in Service Zone 2, 175 in Service Zone 3, and 85 in Service Zone 4. Pressure-reducing valves (PRVs) have been inserted to extend the service areas of Service Zones 2, 3 and 4 down to 2,570 feet, 2,202 feet, and 1,992 feet respectively.

C. Existing Wastewater System (Individual Wastewater System-IWS)

A 5-year Variance Renewal was granted on July 18, 2002 by the State of Hawaii Department of Health (DOH) for use of Individual Wastewater Systems (IWS) within the existing Kula Residence Lots, Unit 1 Subdivision. (Ref. Variance Application No. WW 112R Docket No. 01-VWW-05). The original 5-year variance (Ref. Docket No. 95-VWW-14) was granted on June 3, 1986, by DOH. The variance request was for a total of 386 residential lots to utilize IWS within the Kula Residence Lots, Unit 1 Subdivision. However, only 321 residential lots were actually initially developed by the Kula Residence Lots, Unit 1 Subdivision. Therefore, 65 residential lots from the proposed subdivision could be covered under the renewed variance. The variance renewal was granted by DOH with the following conditions:

1. The individual wastewater systems to be constructed shall comply with the wastewater rules in effect at the time the lessee applies for a building permit.

2. The volume of wastewater generated on each lot shall not exceed a design flow of 1,000 gallons per day.

3. Additional dwelling units or "ohana" dwellings must be approved by the DOH.

4. All dwellings must connect to the public sewer when available.

5. Residents should be provided with educational materials to help them prevent groundwater contaminations.

DHHL has distributed DOH's conditions and educational materials to the lessees. The 5-year Variance renewal will expire on July 18, 2007. DHHL will request for 5-year Variance renewals at or before the expiration dates.

D. Existing Electrical System (Maui Electric Company-MECO)

Utility poles with overhead electrical lines, transformers, and streetlights were installed within the roadways and provide electrical service to the existing Kula Residence Lots, Unit 1 Subdivision (Ref. MECO Dwg. No. 4-4-46).

E. Existing Telephone System (Sandwich Isles Communication-SIC)

Underground handholes, pullboxes, conduits and wires were installed within the roadways and provide telephone service to the existing Kula Residence Lots, Unit 1 Subdivision.

V. EXISTING ROADWAYS

The majority of roadways and infrastructure were constructed during the development of the Kula Residence Lots, Unit 1 Subdivision. The roadways are comprised of 50-foot and 40-foot Right-of-Ways with 24-foot and 22-foot wide travelways, respectively. Right-of-Ways include paved travelways and swales. The roadways were designed to County Standards (i.e. rural) and are maintained by Maui County.

VI. PROPOSED SITE IMPROVEMENTS

A. Proposed Grading

Grading for the project site will involve excavation and embankment within the roadway right-of-way and within some of the adjacent onsite lots.

Erosion control measures will be utilized during construction to minimize soil loss and erosion hazards.

B. Proposed Drainage

The drainage plan for the project will include paved swales along roadways, diversion ditches and swales, underground drainage system and roadway culverts. The underground drainage system will include drain inlets, drain manholes, piping systems and outlet structures.

In general, the Rational Method will be used to determine the onsite storm water runoff quantities. The roadway and diversion swales and underground drainage system will be designed for the 10-year/1-hour storm and 50-year/1-hour storm recurrence intervals. The Rational Method is briefly described as follows.

$$Q = CIA$$

Where:

Q	=	storm water runoff quantity (cfs)
C	=	runoff coefficient
I	=	rainfall intensity in inches per hour for a duration equal to the time of concentration (Tc)
A	=	drainage area (acres)

Applicable sections of the "Drainage Standards for County of Maui", County of Maui Department of Public Works and Waste Management, July 1995, will be used as a reference.

The Natural Resources Conservation Service (NRCS) Hydrograph Analysis Method or the NRCS computer program TR-20 will be used to determine the peak offsite storm runoff (100-year/24-hour storm recurrence interval) from areas greater than 100 acres and to analyze the hydraulics for the project's proposed culvert crossings. The peak off-site flows for the existing culvert crossings near Kula Highway are shown on Exhibit 3. On-site hydrology maps for the proposed subdivisions are shown on Exhibits 5 and 6. The "National Engineering Handbook, Section 4, Hydrology, Supplement A" or latest revision will be used as reference.

There are two (2) concrete box culverts proposed to be located within the Waiohuli Uka Subdivision within the project area (Exhibit 6). Both are designed to handle peak runoff during a 100-year storm of 24-hour recurrence interval. Culvert 67 will be located beneath Roadway 67 and directs water from Waiohuli Bridge on the eastern side of the property to the western side. Its dimensions will be 12 x 10 feet in cross section and spans 101 feet in length. Its upper and lower inverts will be located at 2760.00 and 2750.68 feet respectively. The peak runoff based on a 100-year storm flow passing through this culvert is expected to be approximately 1520 cfs (cubic feet per second). Culvert 68 will be located beneath Roadway 68 and channels water from Culvert No. 2 located along Kula Highway in a southeasterly to northwesterly direction. Its dimensions will be 10 x 10 feet in cross section and spans 117 feet in length. Its upper and lower inverts will be located at 2849.0 and 2830.0 feet respectively. A flow of 480 cfs is expected to pass through this culvert during a 100-year storm at 24-hour recurrence interval. Both culverts will be made of precast reinforced concrete.

C. Proposed Water System

The proposed water system for Waiohuli Subdivisions Hikina, Uka and Lot 134 will be constructed in accordance with the Water System Standards for the State of Hawaii.

The design of the proposed water system pipelines will be based on parameters taken from the "Water System Standards," State of Hawaii, 2002.

Parameters used are as follows:

1. The average daily demand for a single family for Maui County will be equal to 600 gallons per day (gpd) per unit.
2. The fire flow requirement will be based on a rural land use equal to 1000 gallons per minute (gpm) for a duration of two (2) hours.
3. The maximum daily flow plus fire flow will have a residual pressure of 20 psi at a critical fire hydrant.
4. The peak hour flow will have a minimum residual pressure of 40 psi.
5. The "C" values to be applied will be:

Diameter	"C"
4", 6"	100
8", 12"	110

6. The maximum velocity in mains will be:

   a. 10 feet per second for distribution mains with fire flow.

   b. 20 feet per second for transmission mains without water services or fire flow.

   c. 13 feet per second for fire line.

The average daily demand for the proposed project will be approximately 59,400 gallons per day. Waterlines for a total of 99 proposed residential lots, 11 in Service Zone 1, 52 in Service Zone 2, and 36 in Service Zone 3 will be connected to their respective tanks.

The proposed water distribution system will tie in with the existing water mains located within the existing roadways. Water mains will be provided within the proposed roadways with laterals providing service to each proposed lot. The Uka subdivision encompasses all three (3) of the existing onsite service zones 2,370 feet MSL, 2,770 feet MSL, and 3,015 feet MSL and extends into the upper offsite 3,195 feet MSL service zone. The Hikina subdivision encompasses the upper three (3) onsite service zones, and the Lot 134 subdivision exists entirely within the upper offsite service zone. Lot 134 will be fed directly from the existing 8-inch offsite line along Kula Highway. Fire flow to the upper most region of the 3,015 feet MSL service zone will also be supplied by the offsite 3,195 feet MSL service zone.

D. Proposed Wastewater System

The proposed project will utilize IWS for each lot. A variance will be sought from the State of Hawaii, Department of Health for the use of IWS, since the project will exceed the 50-lot limit, as described in the DOH Administrative Rules, Chapter 11-62, "Wastewater System". Since 65 residential lots from the proposed subdivision could be covered under the renewed variance for the Kula

Residence Lots, Unit 1 Subdivision, a variance for the proposed project for the remaining 34 lots will be sought from the State of Hawaii, Department of Health.

E. Proposed Electric, Street Lighting, and Telephone System

Installation of proposed overhead lines for electrical, street lighting and underground telephone lines will be coordinated by the respective utility companies. The proposed system will tie into the existing systems located within the existing roadways.

VII. PROPOSED ROADWAY IMPROVEMENTS

The proposed roadway system will be based on the Maui County Code, with the following exceptions:

1. Power lines will be installed overhead (for Waiohuli Uka, Waiohuli Hinina, and Waiohuli Lot 134).
2. The cul-de-sacs may be more than 500 feet (for Waiohuli Uka and Waiohuli Hikina).
3. The cul-de-sacs may serve more than 20 lots (for Waiohuli Uka).
4. Flag lots may be located back-to-back (for Waiohuli Uka, Waiohuli Hikina, and Waiohuli Lot 134).
5. Street trees will not be planted.

Reference:

1. DHHL Letter Re: Exemptions for Lot 134 Subdivision, dated 12/20/02.
2. DHHL Letter Re: Exemptions for Waiohuli Hikina Subdivions, dated 12/23/02.
3. DHHL Letter Re: Exemptions for Waiohuli Uka Subdivision, dated 12/23/02.

The proposed roadway system will consist of collector streets, minor streets and cul-de-sacs. The collector streets will have a right-of-way width of 50 feet with a travelway and lane width of 24 and 12 feet respectively. The minor streets will have a right-of-way width of 40 feet with a travelway and lane width of 22 and 11 feet

respectively. A pavement justification report will be prepared for the required pavement sections. Portland cement concrete pavement sections will be used for road slopes that exceed 12 percent, the paving limits of asphaltic concrete.

VIII. CONCLUSION

This project shall be developed in accordance with the County of Maui Standards. The proposed project will not have significant short-term or long-term impact on the existing community for the following reasons:

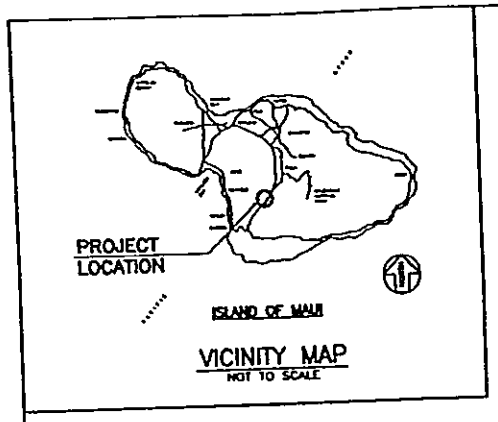
1. Five (5) privately-owned kuleanas are located within the project site and are excluded from the proposed development, with access to these parcels being maintained.

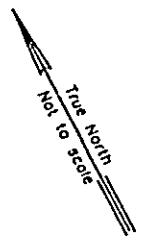
2. The proposed project will provide the required onsite and offsite infrastructure improvements and therefore, will not burden the existing utility systems surrounding the project.

3. Temporary and permanent erosion control measures will be implemented to minimize soil loss and erosion hazards and protect the existing gulches, drainageways, and drainage systems.

4. The drainage system will be designed to minimize the impact of the project storm runoff to downstream and adjoining properties.

EXHIBITS





TMK: 2nd Div. 2-2-02:15
KAONOULU RANCH

KULA RESIDENCE LOTS,
UNIT 1 SUBDIVISION/PROJECT SITE
(Refer to Site Plan for Details)

LOT A
(TMK: 2nd Div. 2-2-02:56)
DEPARTMENT OF HAWAIIAN
HOME LANDS

LOT B
(TMK: 2nd Div. 2-2-02:14)
DEPARTMENT OF HAWAIIAN
HOME LANDS

LOT C
TMK: 2nd Div.
(2-2-02:55)
DEPARTMENT OF
HAWAIIAN HOME
LANDS

TMK: 2nd Div. 2-2-05:04

TMK: 2nd Div. 2-2-05:06

Kula Highway

Polipoli Road

Kula Sanitorium

Cross Rd.

Kekaa Dr.

To Makawao

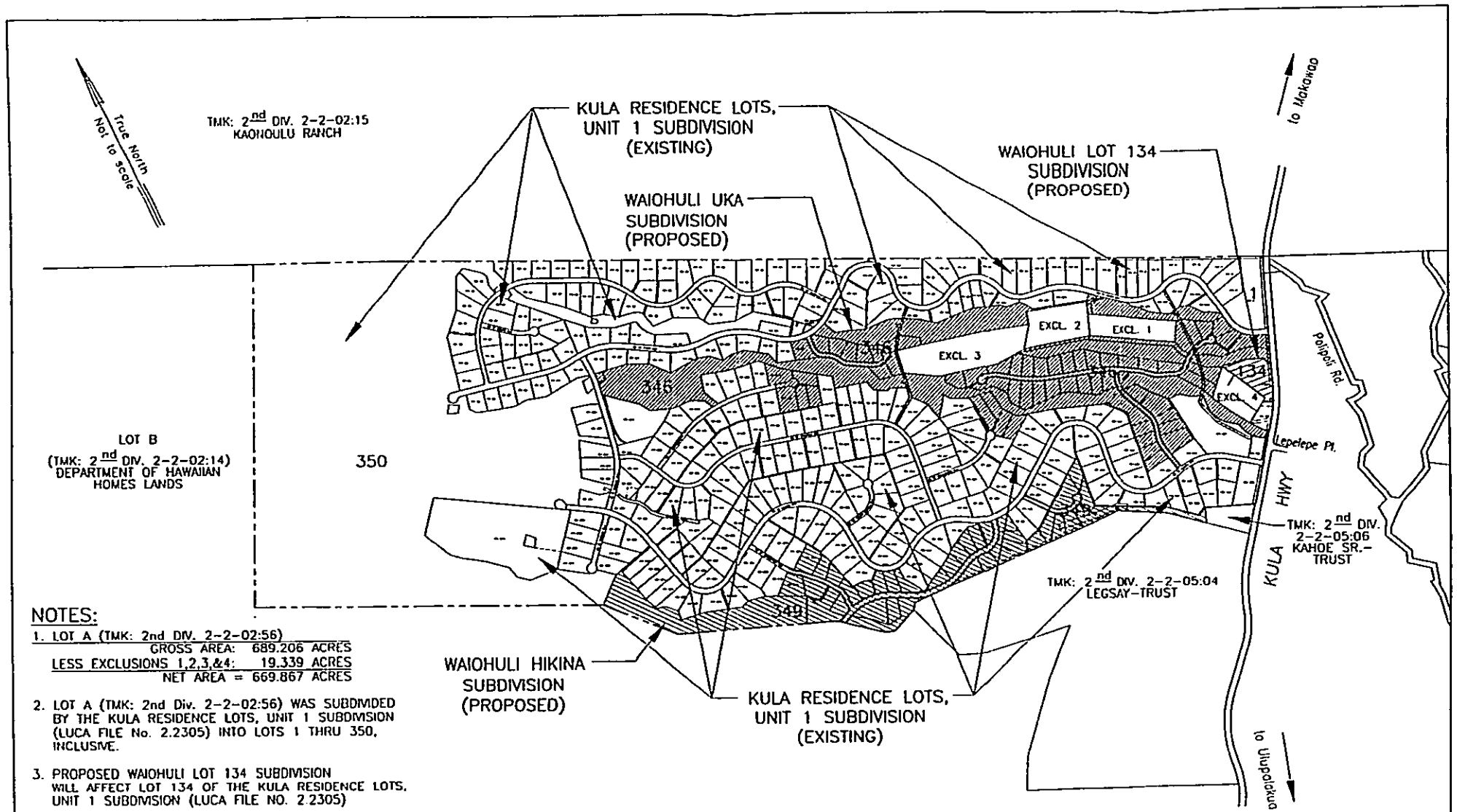
To Ulupalakua

REF.: 1. WAIOHULI KEOKEA LARGE LOT SUBDIVISION
(LUCA FILE No. 2.2300)

2. KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION
(LUCA FILE No. 2.2305)

LOCATION MAP

PRELIMINARY ENGINEERING REPORT HAWAIIAN HOME LAND SUBDIVISION WAIOHULI – HIKINA, UKA AND LOT 134 WAILUKU, MAUI, HAWAII	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. LOCATION/VICINITY MAPS	EXHIBIT 1



NOTES:

1. LOT A (TMK: 2nd DIV. 2-2-02:56)
   GROSS AREA: 689.206 ACRES
   LESS EXCLUSIONS 1,2,3,&4: 19.339 ACRES
   NET AREA = 669.867 ACRES

2. LOT A (TMK: 2nd Div. 2-2-02:56) WAS SUBDIVIDED BY THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE No. 2.2305) INTO LOTS 1 THRU 350, INCLUSIVE.

3. PROPOSED WAIOHULI LOT 134 SUBDIVISION WILL AFFECT LOT 134 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI UKA SUBDIVISION WILL AFFECT LOTS 112, 137, 193, 194, 195, 343, & 346 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI HIKINA SUBDIVISION WILL AFFECT LOTS 294, 295, 345, & 349 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

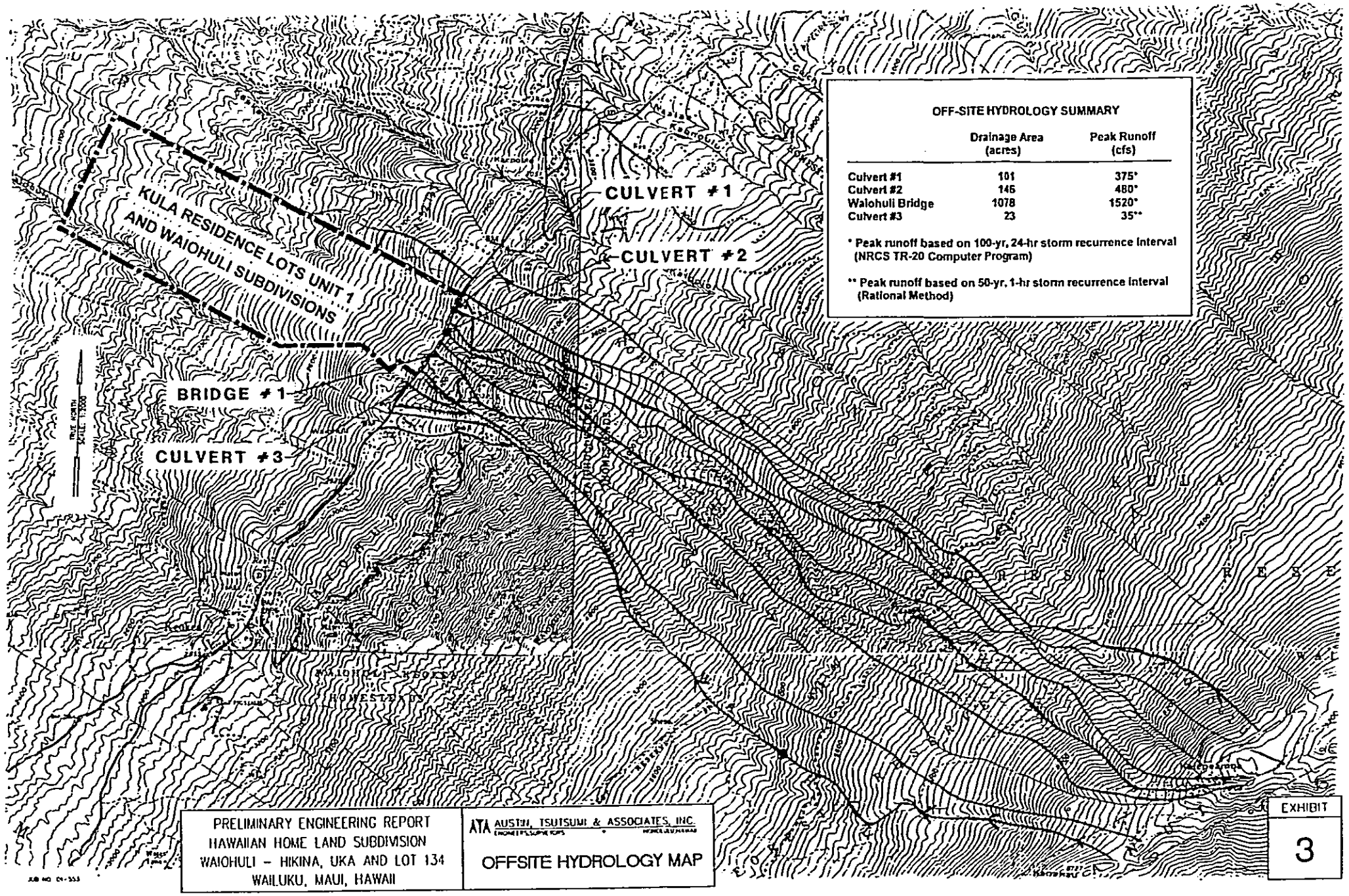
   REF.: KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI - HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS/SURVEYORS • HONOLULU, HAWAII

SCHEMATIC PLAT MAP

EXHIBIT 2



OFF-SITE HYDROLOGY SUMMARY

	Drainage Area (acres)	Peak Runoff (cfs)
Culvert #1	101	375*
Culvert #2	146	480*
Waiohuli Bridge	1078	1520*
Culvert #3	23	35**

* Peak runoff based on 100-yr, 24-hr storm recurrence interval (NRCS TR-20 Computer Program)

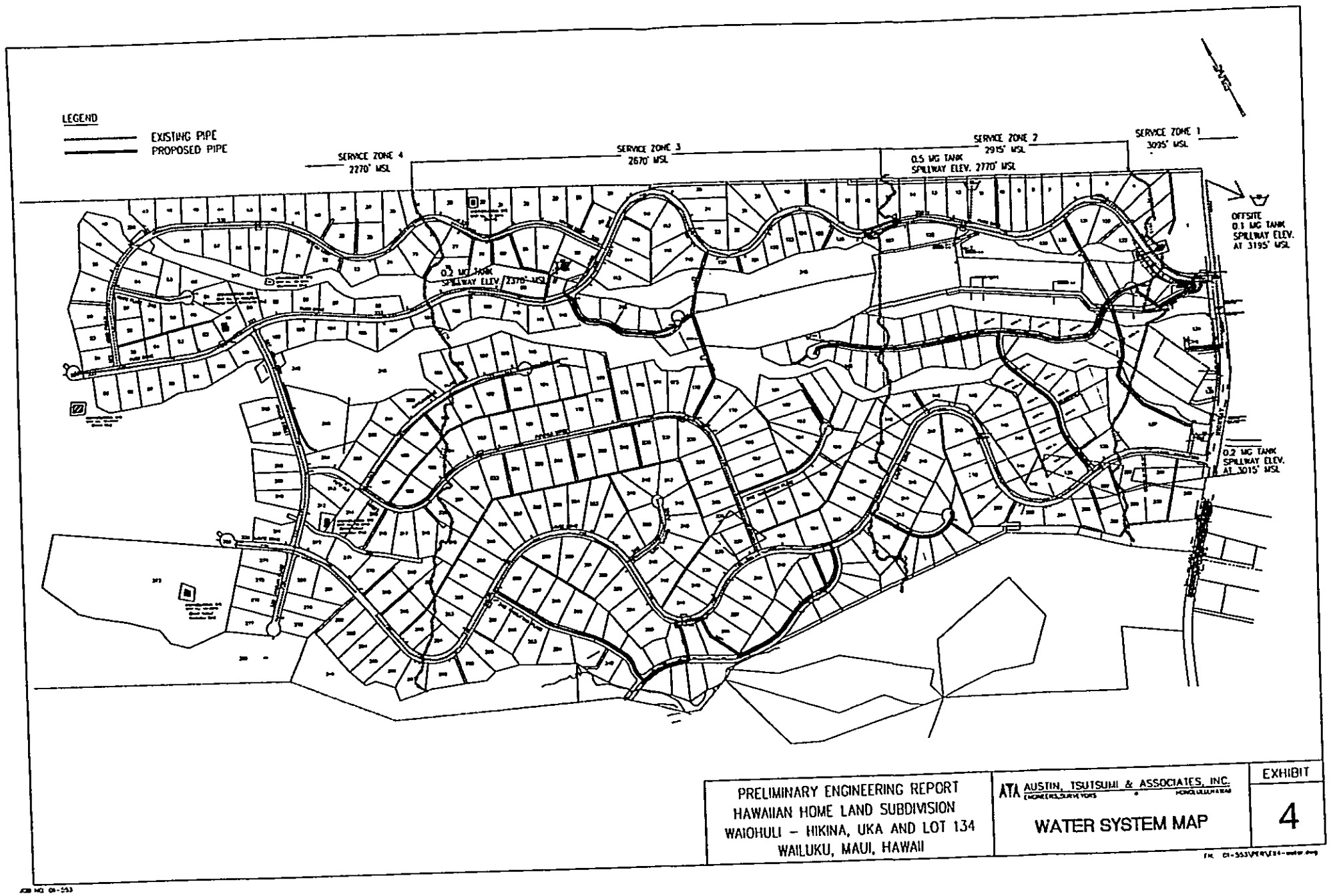
** Peak runoff based on 50-yr, 1-hr storm recurrence interval (Rational Method)

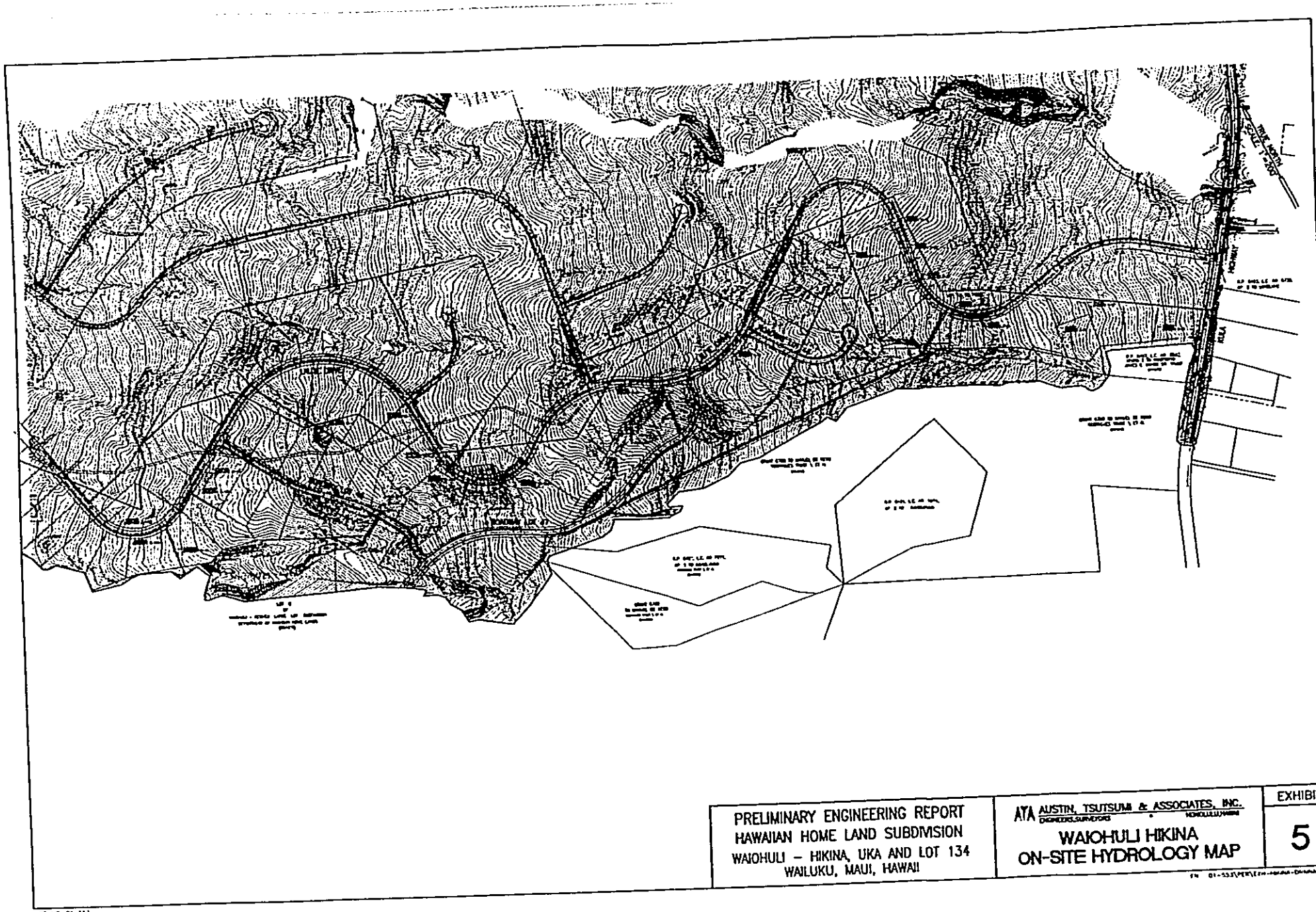
PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI - HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.

OFFSITE HYDROLOGY MAP

EXHIBIT 3


LEGEND
EXISTING PIPE
PROPOSED PIPE
SERVICE ZONE 4
2270' MSL
SERVICE ZONE 3
2670' MSL
SERVICE ZONE 2
2915' MSL
SERVICE ZONE 1
3095' MSL
0.5 MG TANK
SPILLWAY ELEV. 2770' MSL
0.2 MG TANK
SPILLWAY ELEV. 2370' MSL
OFFSITE
0.1 MG TANK
SPILLWAY ELEV.
AT 3195' MSL
0.2 MG TANK
SPILLWAY ELEV.
AT 3015' MSL
PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI - HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII
ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
WATER SYSTEM MAP
EXHIBIT
4

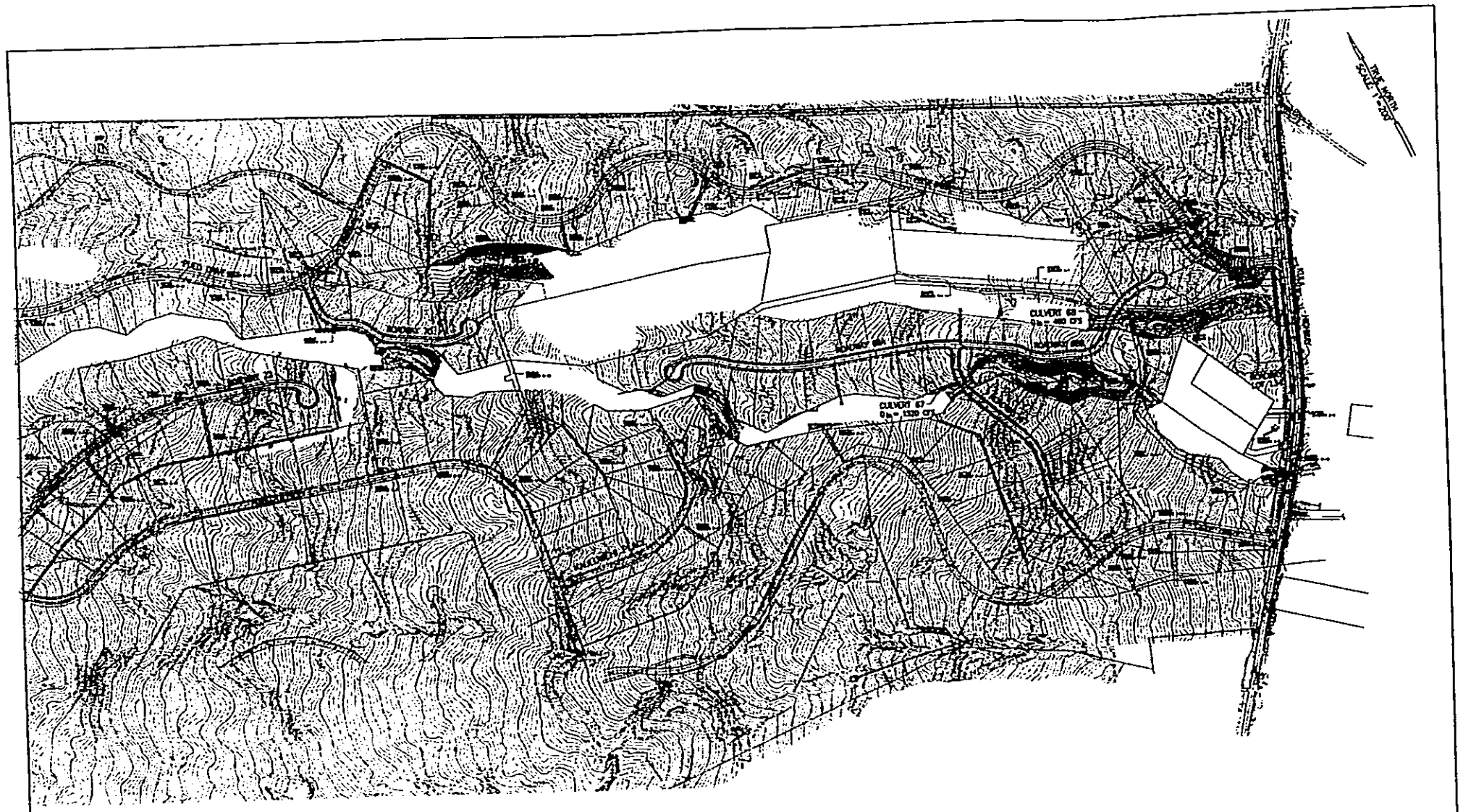


PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS • HONOLULU, HAWAII

WAIOHULI HIKINA
ON-SITE HYDROLOGY MAP

EXHIBIT
5



PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS • HONOLULU, HAWAII

WAIOHULI UKA AND LOT 134
ON-SITE HYDROLOGY MAP

EXHIBIT
6

Appendix D-1

Department of Health Approval Letter for Individual Wastewater Treatment Systems, September 7, 2004

LINDA LINGLE
GOVERNOR OF HAWAII

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

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

SEP 10 2004

In reply, please refer to:
EMD / WB

September 7, 2004

M2 2 002 056.wpd
w11 wb040771

Mr. Mich Hirano, AICP
Munekiyo & Hiraga, Inc.
305 High Street, Suite 014
Wailuku, Maui, Hawaii 96793

Dear Mr. Hirano:

Subject: **Proposed Hawaiian Homestead Land Subdivisions at Waiohuli - Draft Environmental Assessment**
TMK: (2) 2 - 2 - 002: 056

We have reviewed the subject document which proposes to create three (3) residential subdivisions on Hawaiian homestead lands at Waiohuli in Kula, Maui, Hawaii. The proposed action addresses the need for improved houselots for residential construction and occupancy by Hawaiian homestead land lessees.

We have the following comments to offer. We have determined that an Application for Variance was filed and granted by the Department of Health on July 18, 2002 for the Kula Residence Lots Unit 1, Waiohuli, Kula, Maui, Hawaii (Variance Application No. WW 112 R / Docket No. 01-VWW-05). We recommend connection to the County sewer service system for all dwellings/lot when it becomes available. However, as that may not be reasonable at this time, we will allow the construction and use of treatment individual wastewater systems which must comply with the wastewater rules in effect at the time the lessee applies for a building permit.

All wastewater plans must conform to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems." We do reserve the right to review the detailed wastewater plans for conformance to applicable rules. Should you have any questions, please contact the Planning & Design Section of the Wastewater Branch at direct toll free no. 984-2400, extension 64294.

Sincerely,

HAROLD K. YEE, P.E., CHIEF
Wastewater Branch

c: June Harrigan-Lum, EPO

Attachment: Variance Application No. WW 112R, Docket No. 01-VWW-05

Appendix E

Traffic Impact Analysis Report

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI
WAIOHULI HIKINA, WAIOHULI UKA
AND WAIOHULI LOT 134

Kula, Maui, Hawaii

FINAL

Prepared for
State of Hawaii
Department of Hawaiian Home Lands

Prepared by
Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku, Hawaii

February 17, 2004
Revised June 29, 2004

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

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ATA AUSTIN TSUTSUMI & ASSOCIATES, INC
CIVIL ENGINEERS • SURVEYORS

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(Continued)

TABLES

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(Continued)

KENNETH K. KUROKAWA, P.E.
LAMBERT J. YAMASHITA, P.E.
DONOHUE M. PUA, P.E.
STANLEY T. WATANABE
TERRANCE S. ARASHIRO P.E.

TRAFFIC IMPACT ANALYSIS REPORT FOR THE HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI WAIOHULI HIKINA, WAIOHULI UKA, AND WAIOHULI LOT 134 KULA, MAUI, HAWAII

I. INTRODUCTION

A. Purpose and Scope

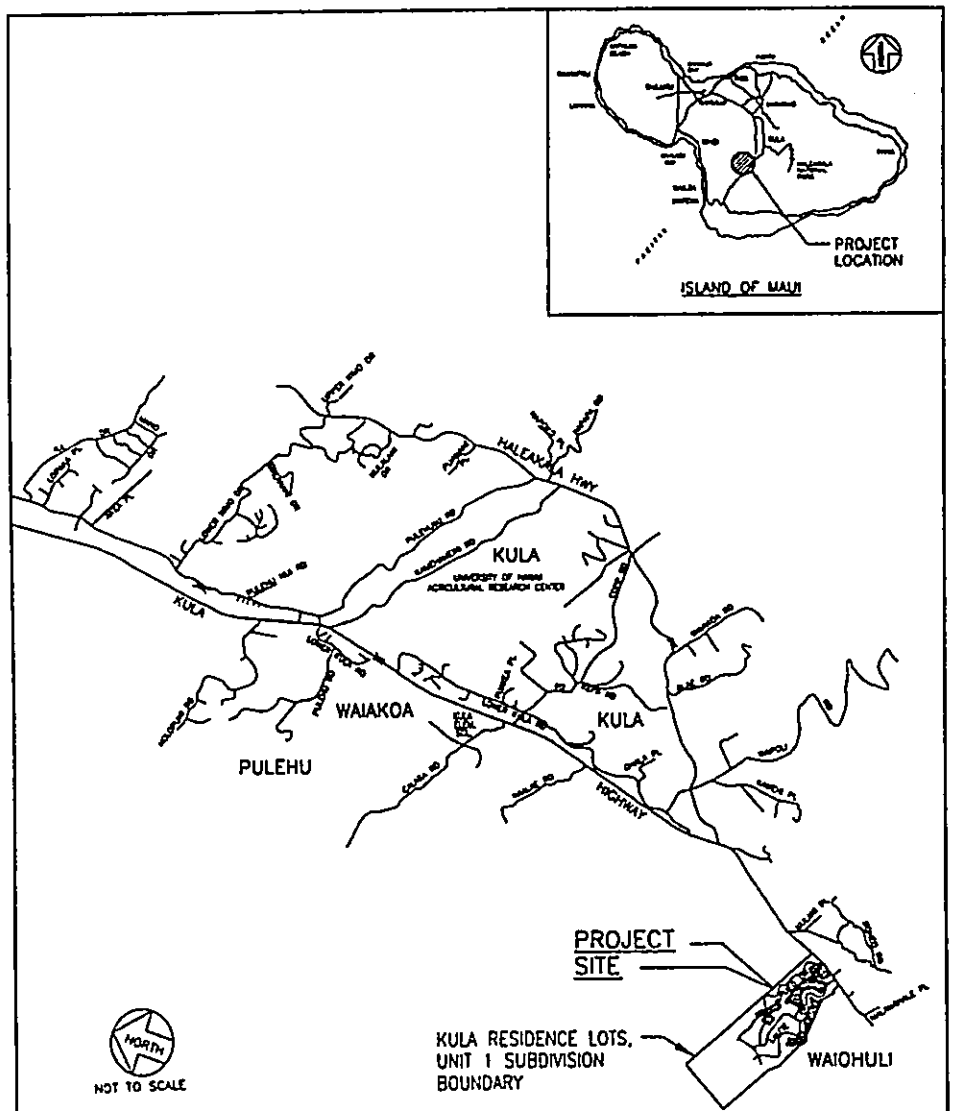
This report documents the findings and recommendations of a traffic study conducted by Austin, Tsutsumi and Associates, Inc. to evaluate the potential traffic impacts resulting from the development of the Hawaiian Home Lands Subdivisions at Waiohuli (herein after referred to as the Project).

B. Project Location

The Project is located in the Waiohuli area of the Kula District on the Island of Maui. The Project site is on the west side of Kula Highway within the Kula Residence Lots, Unit 1 Subdivision. The total parcel area of the existing Kula Residence Lots, Unit 1 Subdivision encompasses 689.21 acres and is more specifically identified as Tax Map Key No. 2-2-02:56. The Project is referenced by Development Services Administration (DSA) Subdivision File No. 2.2761 (Waiohuli Lot 134 Subdivision), 2.2762 (Waiohuli Uka Subdivision) and 2.2763 (Waiohuli Hikina Subdivision). Figure 1 shows the location of the Project site.

C. Project Description

The Project will subdivide approximately 122 acres and will consist of rural subdivisions with a total of 99 new lots, new roadways and related infrastructure. The 99 new lots will be developed as three (3) Hawaiian Home Lands Subdivisions: Waiohuli Hikina, Waiohuli Uka, and Waiohuli Lot 134. Individual lot sizes range from one-half acre to one acre.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII	FIGURE 1
	LOCATION MAP	

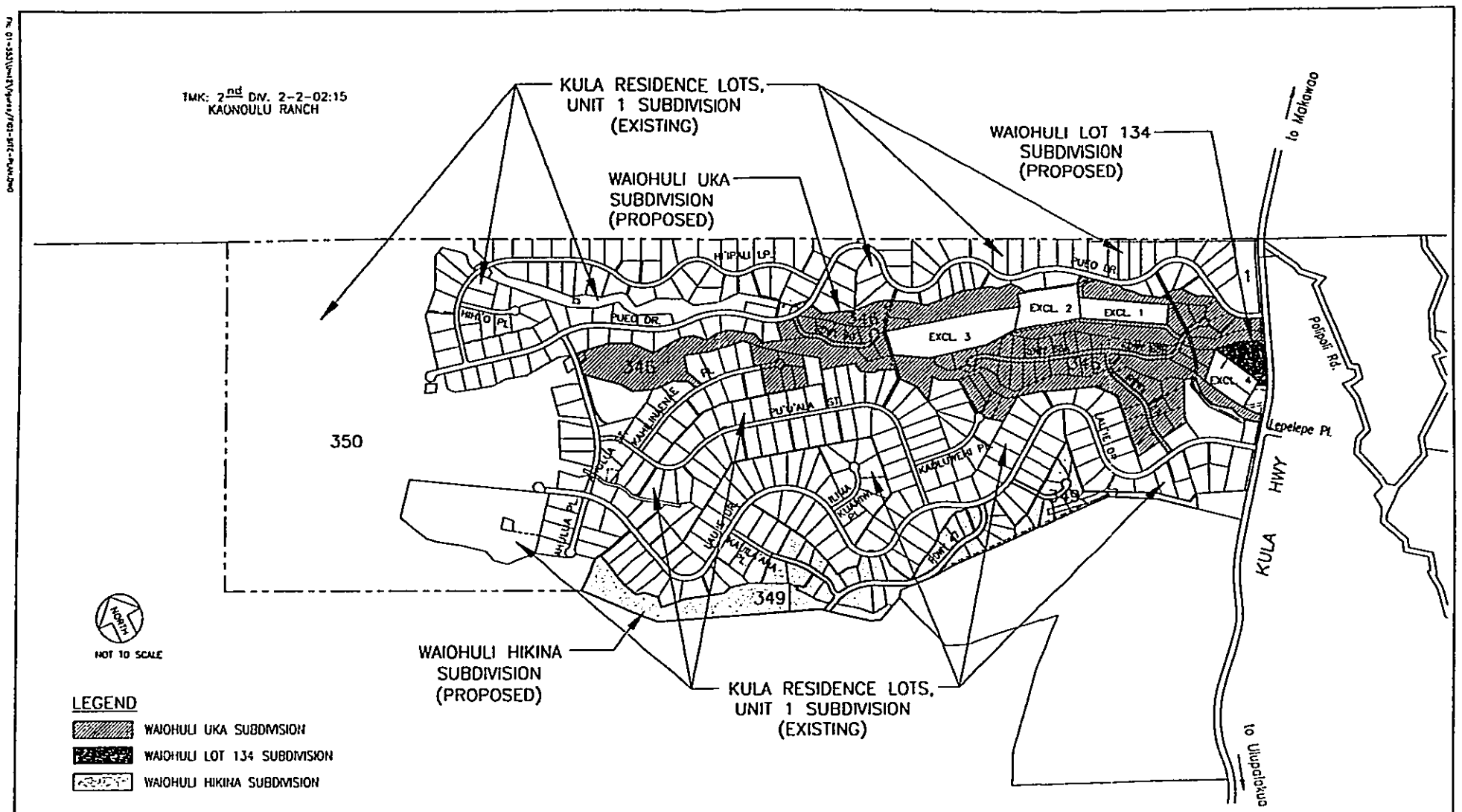
The proposed Waiohuli Hikina Subdivision will consolidate Lots 294, 295, 345 and 349 (37.30 acres) of the existing Kula Residence Lots, Unit 1 Subdivision and will subdivide them into 36 new lots. The proposed Waiohuli Uka Subdivision will consolidate Lots 112, 137, 193, 194, 195, 343 and 346 (81.92 acres) of the existing Kula Residence Lots, Unit 1 Subdivision and will subdivide them into 59 new lots. The proposed Waiohuli Lot 134 Subdivision will subdivide Lot 134 (2.47 acres) of the existing Kula Residence Lots, Unit 1 Subdivision into four (4) new lots.

Figure 2 shows the proposed site plan for the Project.

D. Study Methodology

This study will address the following:

1. Existing traffic operating conditions.
2. Base year (build-out year of the proposed Project) traffic projections without Project-generated traffic, and with known developments near the Project that have been recently completed or are currently under construction.
3. Base year traffic projection without Project-generated traffic and with other known future developments near the Project that are anticipated to be completed by the base year.
4. Trip generation and traffic assignment characteristics for the proposed Project.
5. Determination of the potential impact of Project-generated traffic on the base year traffic operations with known developments near the Project that have been recently completed or are currently under construction.
6. Determination of the potential impact of Project-generated traffic on the base year traffic operations with other known future developments near the Project that are anticipated to be completed by the base year.
7. Recommendation of traffic mitigation measures as appropriate, to mitigate the traffic impacts resulting from Project-generated traffic.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII SITE PLAN	FIGURE 2

II. EXISTING CONDITIONS

A. Roadway System

The following is a brief description of the existing roadway network in the vicinity of the Project:

Haleakala Highway is generally a two-lane, arterial State highway that links Kahului with Haleakala National Park. The roadway intersects Hana Highway in Kahului on the west side of Kahului Airport. Haleakala Highway is generally oriented in the east-west direction, beginning in Kahului, intersecting Old Haleakala Highway and Kula Highway at the Five Trees Junction and terminating at Haleakala National Park. When the traffic count data was collected, Haleakala Highway was a three-lane facility from Hana Highway to Makawao Avenue with two (2) lanes in the eastbound (mauka) direction and a single lane in the westbound (makai) direction. Since then, Haleakala Highway has been widened to four (4) lanes, two (2) lanes in each direction, from Hana Highway to just east of Firebreak Road. Haleakala Highway has a posted speed limit of 45 miles per hour (mph) on the section between Makawao Avenue and the Five Trees Junction. East of the Five Trees Junction, Haleakala Highway has a posted speed limit of 30 mph except for the section fronting King Kekaulike High School, where the posted speed limit is reduced to 25 mph during the morning and afternoon peak periods of school traffic.

Kula Highway is a two-lane, rural, State highway that connects the Pukalani area with the Ulupalakua area. Kula Highway is generally oriented in the north-south direction and begins in Pukalani at the Five Trees Junction of Old Haleakala Highway and Haleakala Highway. Kula Highway eventually becomes Piilani Highway south of the study area. In the vicinity of the Project site, Kula Highway has a posted speed limit of 45 mph. Fronting King Kekaulike High School, the posted speed limit is reduced to 25 mph during the morning and afternoon peak hours of school traffic. Fronting Kula Elementary School, the posted speed limit is reduced to 20 mph during school hours.

Old Haleakala Highway is a two-lane, County collector road that serves the Pukalani area. Old Haleakala Highway provides a parallel route to Haleakala Highway through the town of Pukalani. Old Haleakala Highway is oriented in the

north-south direction as it intersects with Haleakala Highway approximately one-half mile east of Haliimaile Road and changes to an east-west roadway through Pukalani and terminates at the Five Trees Junction at Haleakala Highway and Kula Highway. Old Haleakala Highway has a posted speed limit of 35 mph.

Makani Road is a two-lane, County collector road that serves Pukalani town and Makawao town. Makani Road is generally oriented in the north-south direction, originating within Pukalani Town at its intersection with Old Haleakala Highway, intersecting Haleakala Highway after which it turns to a northeasterly direction to eventually intersect with Makawao Avenue.

Pukalani Street is a County collector roadway serving residential and commercial areas in Pukalani town. This roadway is two-lanes except for the segment from Old Haleakala Highway to Iolani Street, which is four-lanes. Pukalani Street is generally oriented in the north-south direction, originating at its intersection with Old Haleakala Highway, and extending southwesterly to the Pukalani Country Club Golf Course.

Within the study area, Makawao Avenue is a two-lane, County collector road that serves Pukalani town and Makawao town. Makawao Avenue is generally oriented in the north-south direction, originating within Pukalani Town at its intersection with Old Haleakala Highway, and extending north through Makawao town. North of its intersection with Baldwin Avenue, Makawao Avenue terminates across from Kaupakulua Road.

Loha Street is a two-lane, County collector roadway serving residential areas in Pukalani Town. Loha Street is a continuation of Makawao Avenue south of its intersection with Old Haleakala Highway.

Aapueo Parkway - is presently a two-lane, east-west, private (at the time of writing this report, it was signed as part of an active construction site not open to the public) collector roadway with a posted speed limit of 20 mph. Aapueo Parkway will be eventually dedicated to the County of Maui and serves as the only access to the Kamehameha Schools Maui Campus and the Kulamalu development.

Omaopio Road is a two-lane, east-west, County collector roadway primarily serving residential and agricultural uses on the west side of Kula Highway. On the east side of Kula Highway, Omaopio Road intersects with

Lower Kula Road, which is a two-lane, County collector road. Lower Kula Road is generally oriented in the north-south direction and runs parallel to Kula Highway.

Kekaulike Avenue is a two-lane, east-west, State collector roadway primarily serving residential and agricultural uses on the west side of Kula Highway. Kekaulike Avenue eventually becomes Haleakala Highway, which runs parallel to Kula Highway.

Pueo Drive is a two-lane, east-west, County collector roadway that originates at its intersection with Kula Highway and extends to the west through the Kula Residence Lots, Unit 1 Subdivision. Pueo Drive is one of two main roadways that are used to service the Kula Residence Lots, Unit 1.

Lauie Drive is a two-lane, east-west, County collector roadway that originates at its intersection with Kula Highway and extends to the west through the Kula Residence Lots, Unit 1 Subdivision. Lauie Drive is the other main roadway that is used to service Kula Residence Lots, Unit 1.

B. Study Intersections

Weekday peak period of traffic turning movement count surveys were conducted by Austin, Tsutsumi & Associates, Inc. on the morning of Thursday, May 1, 2003, and the afternoon of Wednesday, April 30, 2003 at the following study intersections:

- Haleakala Highway/Old Haleakala Highway (Western Intersection) - unsignalized
- Haleakala Highway/Makani Road - unsignalized
- Haleakala Highway/Makawao Avenue - signalized
- Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction) - signalized
- Old Haleakala Highway/Pukalani Street - signalized
- Old Haleakala Highway/Makawao Avenue/Loha Street - signalized
- Kula Highway/King Kekaulike High School (KKHS) Driveway/ Residential Driveway - unsignalized
- Kula Highway/Aapueo Parkway – unsignalized

- Kula Highway/Omaopio Road – unsignalized
- Kula Highway/Kekaulike Avenue – unsignalized
- Kula Highway/Pueo Drive – unsignalized

Also, 24-hour tube counts were obtained at the Kula Highway/Lauie Drive unsignalized intersection by Austin, Tsutsumi & Associates, Inc. from Wednesday, April 30, 2003 to Thursday, May 1, 2003. The following is a description of the study intersections.

At the Haleakala Highway/Old Haleakala Highway (Western Intersection) Old Haleakala Highway makes a 90-degree turn to intersect Haleakala Highway at a modified "tee"-intersection. Old Haleakala Highway is the northbound approach at its unsignalized intersection with Haleakala Highway. The Old Haleakala Highway approach is striped with exclusive lanes for left-turn and right-turn traffic. Left-turn traffic on the Old Haleakala Highway northbound approach is stop sign-controlled. Right-turn traffic on the Old Haleakala Highway northbound approach is yield sign-controlled and channelized by a traffic island. The Haleakala Highway westbound approach is striped with a single through lane, as westbound left-turns are not allowed at this intersection. The Haleakala Highway eastbound approach is striped with two (2) through lanes and an exclusive right-turn lane. Right-turn traffic from the eastbound approach is "free" as there are no conflicting movements.

A contraflow operation on Haleakala Highway is implemented during the weekday AM peak period of traffic. When the contraflow operation is in effect, all traffic on the Haleakala Highway eastbound approach is forced to exit via a right-turn onto Old Haleakala Highway and right-turns from the Old Haleakala Highway northbound approach onto Haleakala Highway are prohibited. As a result of the AM contraflow operation, there are no conflicting movements for the northbound left-turn movement from the Old Haleakala Highway approach. The AM contraflow operation is discussed in more detail in the "Field Observations" section.

Haleakala Highway/Makani Road is an unsignalized "cross" intersection. The Makani Road northbound and southbound approaches are striped with a shared left-turn/through lane and an exclusive right-turn lane. Traffic on the Makani Road northbound and southbound approaches are stop sign-controlled

except for right-turn traffic, which is channelized by traffic islands and is yield sign-controlled. The Haleakala Highway westbound approach is striped with an exclusive left-turn lane and a shared through/right-turn lane. The Haleakala Highway eastbound approach is striped with an exclusive left-turn lane, a through lane, and a shared through/right-turn lane.

Haleakala Highway/Makawao Avenue is a signalized "cross" intersection. The Makawao Avenue northbound and southbound approaches and the Haleakala Highway westbound approach provide exclusive lanes for left-turn traffic, through traffic and right-turn traffic. The Haleakala Highway eastbound approach is striped with an exclusive left-turn lane, two (2) through lanes and an exclusive right-turn lane. Right-turn traffic on each approach is yield sign-controlled and channelized by raised traffic islands.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction) is a signalized "cross" intersection. Haleakala Highway is the southbound and westbound approaches of the intersection (Haleakala Highway makes a 90 degree turn at this intersection). Kula Highway is the northbound approach and Old Haleakala Highway is the eastbound approach at this intersection. The northbound Kula Highway and southbound Haleakala Highway approaches provide exclusive lanes for left-turn traffic, through traffic and right-turn traffic. The westbound Haleakala Highway and eastbound Old Haleakala Highway approaches are striped with a shared left-turn/through lane and exclusive right-turn lane. Right-turn traffic on each approach is yield sign-controlled and channelized by raised traffic islands.

Old Haleakala Highway/Pukalani Street is a signalized "tee"-intersection with Pukalani Street as the stem. The northbound Pukalani Street approach provides exclusive lanes for left-turn traffic and right-turn traffic. The Old Haleakala Highway westbound approach is striped with an exclusive left-turn lane and a through lane. The Old Haleakala Highway eastbound approach is striped with a through lane and an exclusive right-turn lane.

Old Haleakala Highway/Makawao Avenue/Loha Street is a signalized "cross" intersection. The Loha Street northbound and Old Haleakala westbound approaches provide a single lane, which is striped as a shared left-turn/through/right-turn lane. The southbound Makawao Avenue approach is

striped with a shared left-turn/through lane and an exclusive right-turn lane. The Old Haleakala Highway eastbound approach is striped with an exclusive left-turn lane and a shared through/right-turn lane.

Kula Highway/King Kekaulike High School (KKHS) Driveway/Residential Driveway is an unsignalized "cross"-intersection. The southbound Kula Highway approach is striped with an exclusive left-turn lane and a shared through/right-turn lane. The northbound Kula Highway approach is striped with an exclusive right-turn lane that is yield sign-controlled and a shared left-turn/through lane. The westbound KKHS and eastbound residential driveway approaches are stop sign-controlled. The KKHS driveway is striped with an exclusive right-turn lane and exclusive left-turn lane. The residential driveway is striped with a single lane shared approach.

Kula Highway/Aapueo Parkway is an unsignalized "tee"-intersection with Aapueo Parkway as the stop sign-controlled stem. The northbound Kula Highway approach is striped with an exclusive left-turn lane and a through lane. The southbound Kula Highway approach is striped with an exclusive right-turn lane and a through lane. The eastbound Aapueo Parkway approach is striped with an exclusive left-turn lane and an exclusive right-turn lane.

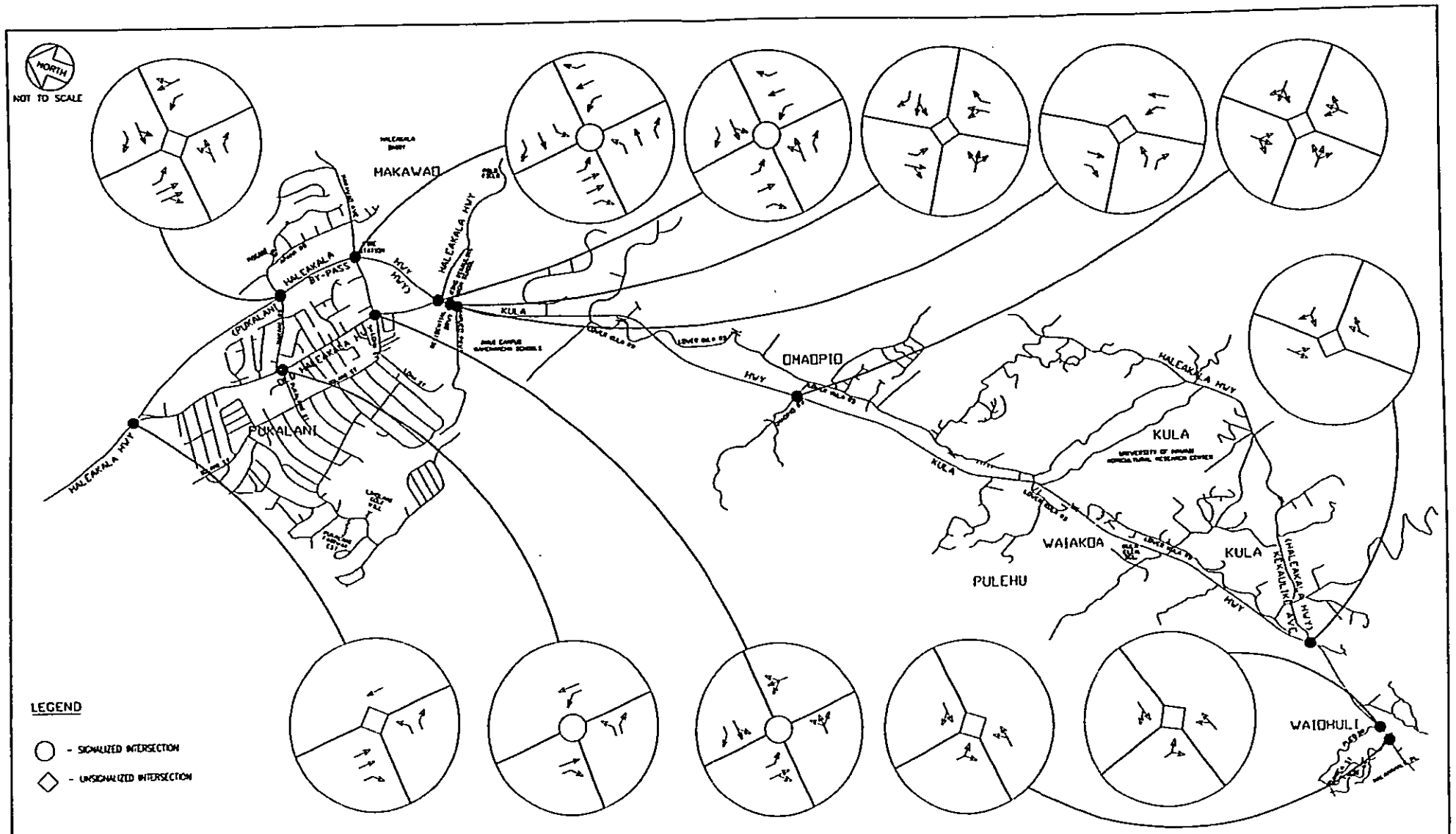
Kula Highway/Omaopio Road is an unsignalized "cross"-intersection. The westbound and eastbound Omaopio Road approaches are stop sign-controlled. All approaches are striped as single-lane shared approaches.

Kula Highway/Kekaulike Avenue is an unsignalized "tee"-intersection with Kekaulike Avenue as the stop sign-controlled stem. All approaches are striped as single-lane shared approaches.

Kula Highway/Pueo Drive is an unsignalized "tee"-intersection with Pueo Drive as the stop sign-controlled stem. All approaches are striped as single-lane shared approaches.

Kula Highway/Lauie Drive is an unsignalized "tee"-intersection with Lauie Drive as the stop sign-controlled stem. All approaches are striped as single-lane shared approaches.

Figure 3 shows the existing traffic lane configurations at the study intersections.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI	ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII EXISTING LANE CONFIGURATION	FIGURE 3

C. Field Observations

The weekday AM and PM peak hours of traffic were determined to occur from 7:00 AM to 8:00 AM and 3:30 PM to 4:30 PM, respectively. In the morning, the peak for traffic generated by KKHS and traffic on Aapueo Parkway (Kamehameha Schools Maui Campus and construction traffic) generally occur within the same time frame as the commuter peak traffic on Kula Highway. In the afternoon, traffic generated by KKHS and Kamehameha Schools Maui Campus peaks earlier than the PM peak hour of commuter traffic. Only the AM and PM peak hours of commuter traffic are considered in this study since the Project is not expected to generate a significant amount of traffic during the PM peak hour of school traffic. In this report, the PM peak hour of traffic refers to the PM peak hour of commuter traffic. The traffic count data is provided in Appendix A.

The State of Hawaii Department of Transportation (SDOT) implements a contraflow operation on Haleakala Highway from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Haleakala Highway/Hana Highway intersection during the weekday AM peak period of traffic. An eastbound lane is used for westbound travel on Haleakala Highway during the AM contraflow operation. All eastbound traffic on Haleakala Highway originating downstream of Old Haleakala Highway is diverted onto Old Haleakala Highway during the contraflow operation. Access to eastbound Haleakala Highway from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction is limited to traffic from Makani Road and Makawao Avenue only.

It was observed that northbound through vehicles on Kula Highway frequently yield to southbound vehicles turning left into the KKHS driveway during the 20-minute period before the start of the KKHS school day (8:00 AM). This results in additional delays for northbound traffic on Kula Highway as a long queue of northbound vehicles extending well past the Aapueo Parkway intersection was observed. As a result of the long queue of northbound vehicles from the KKHS intersection, northbound vehicles on Kula Highway were also observed to frequently yield to eastbound vehicles turning left onto the highway from Aapueo Parkway. After 8:00 AM, traffic volumes tapered off quickly and the queue of northbound vehicles dissipated. Traffic volumes entering and exiting KKHS were much lower and queuing at this intersection was much lighter during the PM peak hour of traffic.

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This is expected since the PM peak hour for school traffic does not coincide with the PM peak hour of commuter traffic as the KKHS school day ends at 2:00 PM.

D. Traffic Operations

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual – HCM 2000 methodology for calculating levels of service was used in this study. LOS definitions for unsignalized and signalized intersections are provided in Appendix B. LOS calculations are provided in Appendix C. It should be noted that overall LOS for unsignalized intersections is no longer calculated in the HCM 2000 procedure; LOS is only calculated for the stop sign-controlled (minor) approaches and for left-turn traffic from the major roadway.

The LOS analysis assumes that drivers behave according to traffic controls and does not account for delays caused by vehicles on Kula Highway yielding to vehicles turning into and out of the KKHS driveway and vehicles turning out of Aapueo Parkway during the AM peak hour of traffic. If drivers continue to behave inconsistently with traffic controls, northbound through vehicles on Kula Highway will experience LOS F conditions in the vicinity of KKHS and Aapueo Parkway during the 20-minute period before the start of the KKHS school day (8:00 AM).

The LOS analysis results for existing traffic conditions at the study intersections are described below. Figure 4 shows the existing traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic. The traffic volumes shown on Figure 4 include traffic associated with current construction activity for the Kamehameha Schools Maui Campus expansion that was observed at the west end of Aapueo Parkway. Table 1 summarizes the existing LOS at the study intersections.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

During the AM peak hour of traffic, all movements at this intersection have no conflicting flow since eastbound traffic on Haleakala Highway (499 vehicles during the AM peak hour of traffic) is diverted onto Old Haleakala Highway because of the AM contraflow operation. During the AM peak hour of traffic, 1,173 vehicles from Haleakala Highway and

758 vehicles from Old Haleakala Highway were headed westbound towards Kahului. Most of these vehicles appear to be going to work in other areas of Maui. During the PM peak hour of traffic, all individual movements at this unsignalized intersection operate at LOS D or better except for northbound left-turn traffic on Old Haleakala Highway, which operates at LOS F. A review of 24-hour traffic count data collected in 2001 by SDOT indicates that traffic volumes at this intersection meet the four-hour warrant for the installation of a traffic signal system as described in the Manual on Uniform Traffic Control Devices - Millennium Edition (MUTCD-2000). The four hours used for this warrant were not during the AM contraflow operation.

Haleakala Highway/Makani Road

All individual movements at this unsignalized intersection operate at LOS D or better during the AM and PM peak hours of traffic except for the following. The Makani Road northbound shared left-turn/through traffic operates at LOS E during the AM peak hour of traffic and LOS F during the PM peak hour of traffic. The Makani Road southbound shared left-turn/through traffic operates at LOS F during the AM and PM peak hours of traffic. Southbound right-turn traffic operates at LOS F during the AM peak hour of traffic. The southbound right-turn volume is high (344 vehicles) during the AM peak hour of traffic because vehicles coming from Makawao Town bypass the Makawao Avenue/Haleakala Highway intersection and instead use Makani Road to turn right onto westbound Haleakala Highway. A review of 24-hour traffic count data collected in 2001 by SDOT indicates that traffic volumes at this intersection meet the eight-hour and four-hour warrants for the installation of a traffic signal system as described in the MUTCD-2000.

Haleakala Highway/Makawao Avenue

This signalized intersection operates overall at LOS C during the AM and PM peak hours of traffic. All individual movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Queuing was observed on the Makawao Avenue southbound approach during the AM peak hour of traffic. The southbound queue averaged over ten vehicles, extending beyond the exclusive right-turn

lane on Makawao Avenue and blocking vehicles from making a right-turn to westbound Haleakala Highway. As a result, southbound vehicles coming from Makawao Town also utilize Makani Road to turn right onto westbound Haleakala Highway.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)

This signalized intersection operates overall at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All individual movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Traffic queues averaging eight (8) to ten (10) vehicles were observed on the northbound Kula Highway approach and on the westbound Haleakala Highway approach during the AM peak period of traffic. During the AM peak hour of traffic, 420 vehicles turned right from eastbound Old Haleakala Highway to southbound Kula Highway. This heavy right-turn volume is in part due to the AM contraflow operation on Haleakala Highway. During the PM peak period of traffic, the average queue length was observed to be about three (3) to four (4) vehicles on the westbound Haleakala Highway approach.

Old Haleakala Highway/Pukalani Street

This signalized intersection operates overall at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All individual movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. During the AM peak hour of traffic, 551 vehicles turned left from Pukalani Street to westbound Old Haleakala Highway. Most of these vehicles appear to be headed to work in other areas of Maui via Haleakala Highway.

Old Haleakala Highway/Makawao Avenue/Loha Street

This signalized intersection operates overall at LOS B during the AM and PM peak hours of traffic. All individual movements at this intersection operate at LOS D or better during the AM and PM peak hours of traffic. Vehicle queues at this intersection were minimal and able to clear with every cycle.

Kula Highway/King Kekaulike High School (KKHS) Driveway/Residential Driveway

All individual movements at this unsignalized intersection operate at LOS D or better during the AM and PM peak hours of traffic except for the following. Westbound left-turn traffic from KKHS and eastbound traffic on the shared driveway approach operate at LOS F during the AM peak hour of traffic and at LOS E during the PM peak hour of traffic. However, few vehicles use the shared driveway approach, five (5) vehicles and three (3) vehicles during the AM and PM peak hours, respectively. During the AM peak hour of traffic, a total of 362 vehicles entered and 143 vehicles exited KKHS at this intersection. The existing traffic volumes at this intersection during the AM and PM peak hours of traffic do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Aapueo Parkway

All individual movements at this unsignalized intersection operate at LOS D or better during the AM and PM peak hours of traffic except for eastbound left-turn traffic on Aapueo Parkway, which operates at LOS F during the AM and PM peak hours of traffic. The existing traffic volumes at this intersection during the AM and PM peak hours of traffic meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000. A traffic signal system was also warranted under existing conditions described in the findings of the Draft Traffic Impact Analysis for Kamehameha Schools Maui Campus.

Kula Highway/Omaopio Road

All individual movements at this unsignalized intersection operate at LOS D or better during the AM and PM peak hours of traffic except for traffic on the shared eastbound Omaopio Road approach, which operates at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. A review of 24-hour traffic count data collected in 2001 by SDOT indicates that traffic volumes at this intersection do not

meet the eight-hour or four-hour warrants for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Kekaulike Avenue

All individual movements at this unsignalized intersection operate at LOS B or better during the AM and PM peak hours of traffic. Vehicle queues at this intersection were minimal.

Kula Highway/Pueo Drive

All individual movements at this unsignalized intersection operate at LOS B or better during the AM and PM peak hours of traffic. Vehicle queues at this intersection were minimal.

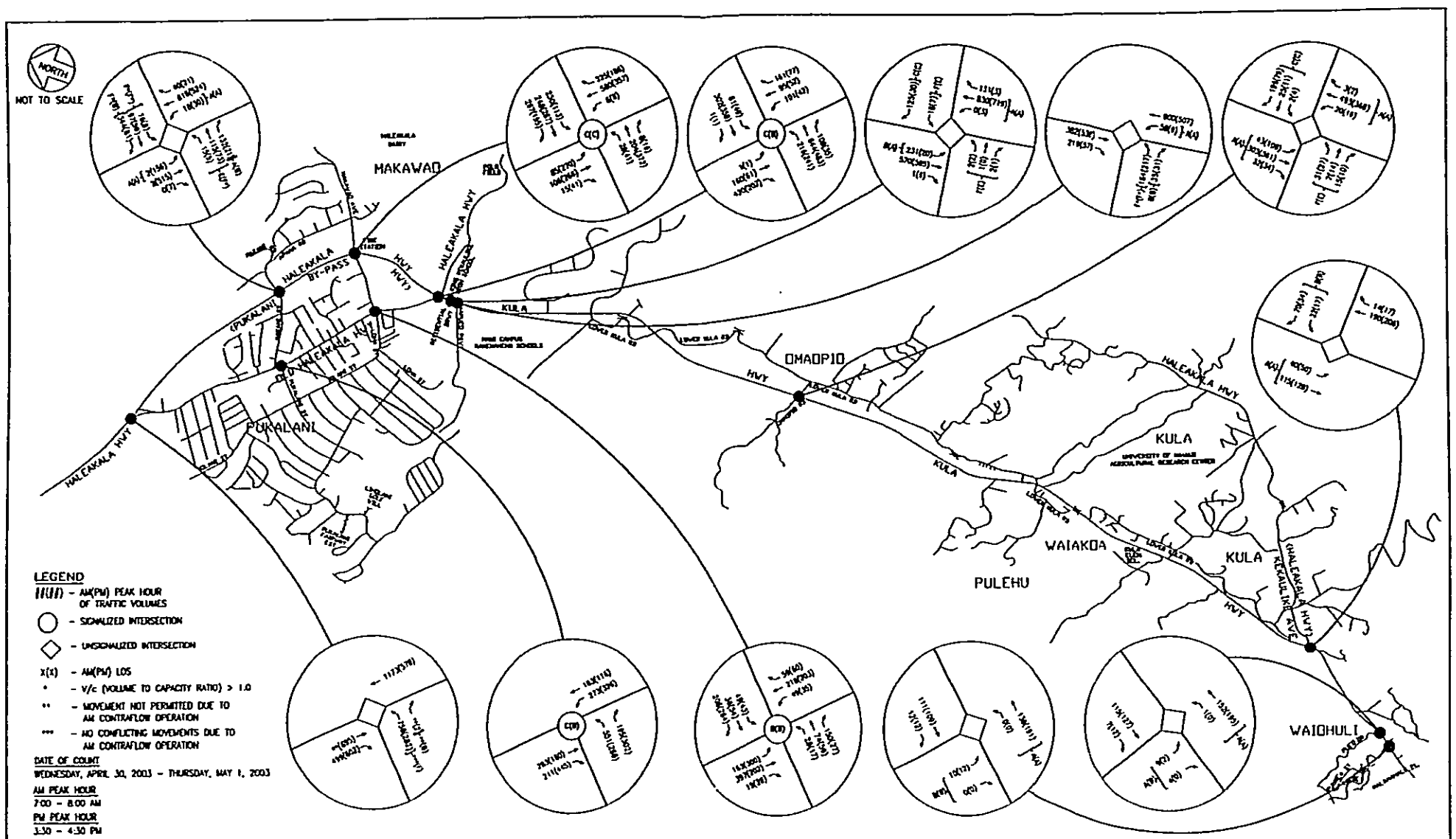
Kula Highway/Laule Drive

All individual movements at this unsignalized intersection operate at LOS B or better during the AM and PM peak hours of traffic. Vehicle queues at this intersection were minimal.

III. BASE YEAR TRAFFIC CONDITIONS WITHOUT PROJECT-GENERATED TRAFFIC

Construction of the roadways and infrastructure for the Project is anticipated to be completed by late 2005/early 2006. Therefore, Year 2007 was chosen to represent base conditions without Project-generated traffic to allow for time needed to build homes within the Project.

Traffic believed to be associated with current construction activity for the Kamehameha Schools Maui Campus expansion was estimated based on the number of construction workers given by the contractor. Construction trips were subtracted from existing traffic counts because they will no longer be generated by the construction project after the Kamehameha Schools Maui Campus expansion is complete. The resulting volumes were increased by applying an annual vehicular growth rate of 1.3 percent per year, which is the approximate annual vehicular growth rate projected for the major roadways in the Pukalani area based on information contained in the Maui Long-Range Land Transportation Plan (MLRLTP), dated February 1997.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI

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EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE 4

Table 1
LOS at Study Intersections
Existing Conditions

	Existing	
	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (Western Intersection)		
NB LT	--	F
NB RT	--	B
Haleakala Highway/Makani Road		
NB LT/TH	E	F*
NB RT	A	B
SB LT/TH	F*	F*
SB RT	F*	B
WB LT	A	A
EB LT	A	A
Haleakala Highway/Makawao Avenue		
NB LT	B	B
NB TH	B	C
NB RT	B	A
SB LT	D	D
SB TH	B	B
SB RT	B	A
WB LT	C	C
WB TH	C	C
WB RT	B	C
EB LT	D	C
EB TH	B	B
EB RT	B	B
Overall	C	C
Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)		
NB LT	C	C
NB TH	C	B
SB LT	C	C
SB TH	B	B
SB RT	B	B
WB LT/TH	C	C
EB LT/TH	C	C
Overall	C	B

*V/c (volume to capacity ratio) > 1.0

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Table 1 (continued)
LOS at Study Intersections
Existing Conditions

	Existing	
	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Pukalani Street		
NB LT	C	B
NB RT	A	B
WB LT	C	B
WB TH	B	A
EB TH	C	B
EB RT	A	A
Overall	C	B
Old Haleakala Highway/Makawao Avenue/Loha Street		
NB LT/TH/RT	B	B
SB LT/TH	B	B
SB RT	C	C
WB LT/TH/RT	B	B
EB LT	A	A
EB TH/RT	A	A
Overall	B	B
Kula Highway/KKHS Driveway/Residential Driveway		
NB LT/TH	A	A
SB LT	B	A
WB LT	F	E
WB RT	C	C
EB LT/TH/RT	F	E
Kula Highway/Aapueo Parkway		
NB LT	A	A
EB LT	F*	F*
EB RT	B	B
Kula Highway/Omaoplo Road		
NB LT/TH/RT	A	A
SB LT/TH/RT	A	A
WB LT/TH/RT	C	C
EB LT/TH/RT	F	E

*V/c (volume to capacity ratio) > 1.0

Table 1 (continued)
LOS at Study Intersections
Existing Conditions

	Existing	
	AM Peak Hour	PM Peak Hour
Kula Highway/Kekaulike Avenue		
SB LT/TH	A	A
WB LT/RT	B	B
Kula Highway/Pueo Drive		
NB LT/TH	A	A
EB LT/RT	A	B
Kula Highway/Laule Drive		
NB LT/TH	A	A
EB LT/RT	B	B

*V/c (volume to capacity ratio)>1.0

The following are two (2) scenarios for Base Year 2007; Scenario A includes traffic from only known developments near the Project that have been recently completed or are currently under construction; Scenario B includes the traffic from Scenario A plus any traffic generated by proposed known developments that may be completed by Year 2007. Each scenario will document which known developments are included in the traffic projections for each of the two base year scenarios.

A. Scenario A

1. Developments Included in Traffic Projections

The following are descriptions of known developments near the Project that have been recently completed or are currently under construction. Only these recently completed or under construction developments are included in the traffic projections for Base Year 2007 Scenario A.

a. Kamehameha Schools Maui Campus Expansion

According to the Kamehameha Schools Maui Campus website, the Maui campus, part of the Kulamalu project which is located in areas along Aapueo Parkway, had an enrollment of about 600 students in grades K through 9 at the time the traffic

count survey was conducted. Addition of one grade level every year is planned, which will expand the campus to a full enrollment of about 1,100 students in grades K through 12 by the 2005 school year. Vehicular trips generated by the expansion of the Kamehameha Schools Maui Campus during the AM peak hour of traffic were obtained from the Draft Traffic Impact Analysis for Kamehameha Schools Maui Campus by Phillip Rowell and Associates, dated June 2002. Vehicular trips generated by the expansion of the Kamehameha Schools Maui Campus during the PM peak hour of traffic were estimated by applying trip generation rates for the peak hour of adjacent street traffic contained in ITE, Trip Generation, 6th Edition since the school peak hour of traffic is not likely to coincide with the 3:30 PM to 4:30 PM commuter peak hour of traffic on Kula Highway.

b. Kula Residence Lots, Unit 1 Subdivision

The Department of Hawaiian Home Lands (DHHL) has constructed 321 lots known as Kula Residence Lots, Unit 1 Subdivision, which is a single-family residential subdivision. Owners of these lots are responsible for construction of their own homes. As of March 2003, 102 lots were occupied. Peak hour trips generated by the development of the remaining vacant lots in Kula Residence Lots, Unit 1 Subdivision were estimated based on the existing number of occupied lots and existing traffic volumes entering and exiting the subdivision. Access to the Kula Residence Lots, Unit 1 Subdivision is provided off of Kula Highway via Pueo Drive and Laule Drive.

c. Keokea Farm Lots

The Keokea Farm Lots project will be located south of the Project site, and will consist of 86 agricultural lots. DHHL has indicated that their past experience with agricultural developments has been that the majority of lessees will have outside employment. It is expected that most of the lots will be used as residential lots and only a minority of lessees will engage in

income producing farming. Construction of the roadways and infrastructure for the Project is anticipated to be completed in late 2006 after which lessees can begin construction of homes or other structures within their lot. Peak hour trips generated by the Keokea Farm Lots were estimated based on the existing number of occupied lots in the Kula Residence Lots, Unit 1 Subdivision and existing volumes entering and exiting the Kula Residence Lots, Unit 1 Subdivision. This method was used since the Project is expected to be similar to the Kula Residence Lots, Unit 1 Subdivision with lots being used primarily for residential purposes. Access to the Keokea Farm Lots project will be directly off of Kula Highway south of the Kula Residential Lots, Unit 1 Subdivision.

Table 2 shows the trips generated during the peak hours of traffic by known developments near the Project that have been recently completed or are currently under construction.

Table 2
Base Year 2007 Scenario A
Peak Hour Trips Generated by Known Developments Near the Project that have been Recently Completed or are Currently Under Construction

	AM Peak Hour		PM Peak Hour	
	Enter	Exit	Enter	Exit
Expansion of Kamehameha Schools Maui Campus (to include grades K-12)	218	145	30	45
Kula Residence Lots, Unit 1 Subdivision (219 remaining lots)	44	50	53	31
Keokea Farm Lots (86 lots)	17	20	21	12
Total	279	215	104	88

2. Planned Roadway Improvements

Installation of a traffic signal system at the Haleakala Highway/Makani Road intersection is planned by SDOT and for the purposes of this study is assumed to be operational by the base year. At the time of this writing, a traffic signal system at the Kula Highway/Aapueo

Parkway intersection was in the design process and for the purposes of this study is assumed to be constructed by the base year.

At the time of writing this study, the widening of Haleakala Highway to four lanes from Hana Highway to Old Haleakala Highway (Western Intersection) by SDOT is currently under construction and anticipated to be completed within the 2005-2006 timeframe. SDOT has indicated that once Haleakala Highway is widened, the AM contraflow operation will be discontinued and vehicles on the Haleakala Highway eastbound approach to Old Haleakala Highway (Western Intersection) will no longer be forced to turn right onto Old Haleakala Highway during the AM peak period of traffic. Projected traffic volumes for the AM peak hour of traffic were reassigned to the roadway network assuming the discontinuation of the AM contraflow operation on Haleakala Highway. Projected traffic volumes for the PM peak hour of traffic were not adjusted since there is no contraflow operation during the PM peak hour.

3. Traffic Operations Without Project-Generated Traffic

The LOS analysis assumes that drivers behave according to traffic controls and does not account for delays caused by vehicles on Kula Highway yielding to vehicles turning into and out of the KKHS driveway and vehicles turning out of Aapueo Parkway during the AM peak hour of traffic. If drivers continue to behave inconsistently with traffic controls, northbound through vehicles on Kula Highway will experience LOS F conditions in the vicinity of KKHS and Aapueo Parkway during the 20-minute period before the start of the KKHS school day (8:00 AM).

Described below are the Base Year 2007 Scenario A traffic conditions <u>without</u> traffic generated by the Project. Analysis indicates traffic at the study intersections will operate at LOS D or better except at the following locations. Figure 5 shows the traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic for Base Year 2007 Scenario A. Table 3 summarizes the LOS at the study intersections for Base Year 2007 Scenario A.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

According to the current roadway design from SDOT, the additional westbound lane on Haleakala Highway provided by the widening will originate as the receiving lane for northbound left-turn traffic from Old Haleakala Highway at its western intersection with Haleakala Highway. As an unsignalized intersection, northbound left-turn traffic will operate at LOS F during the AM and PM peak hours of traffic.

Haleakala Highway/Makani Road

With the installation of a traffic signal system, this intersection will operate overall at LOS D during the AM peak hour of traffic and LOS A during the PM peak hour of traffic. Traffic in the southbound right-turn lane will operate at LOS E during the AM peak hour of traffic.

Haleakala Highway/Makawao Avenue

This signalized intersection will operate overall at LOS D during the AM peak hour of traffic and LOS C during the PM peak hour of traffic. The southbound left-turn lane and eastbound left-turn lane will operate at LOS E during the AM peak hour of traffic.

Kula Highway/KKHS Driveway/Residential Driveway

As an unsignalized intersection, westbound left-turn traffic from KKHS will operate at LOS F during the AM and PM peak hours of traffic. Westbound right-turn traffic from KKHS will operate at LOS E during the AM peak hour of traffic. Eastbound traffic on the shared driveway approach will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. However, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic. The projected traffic volumes at this intersection during the AM and PM peak hours of traffic do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Omaopio Road

As an unsignalized intersection, traffic on the shared westbound approach will operate at LOS E during the AM peak hour of traffic. Traffic on the shared eastbound approach will operate at LOS F during the AM and PM peak hours of traffic. Base Year 2007 traffic volumes with development of only the Kamehameha Schools Maui Campus expansion, remaining lots within Kula Residence Lots, Unit 1 and the Keokea Farm Lots project, are likely to warrant a traffic signal system at this intersection.

Kula Highway/Aapueo Parkway

With the installation of a traffic signal system, this intersection will operate overall at LOS B during the AM peak hour of traffic and LOS A during the PM peak hour of traffic. All individual movements will operate at LOS D or better during the AM and PM peak hours of traffic.

4. Traffic Mitigation Measures

The following traffic mitigation measures are proposed to accommodate projected traffic volumes for Base Year 2007 Scenario A without Project-generated traffic. Table 3 summarizes the LOS analysis for Base Year 2007 Scenario A with traffic mitigation measures for the affected intersections.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

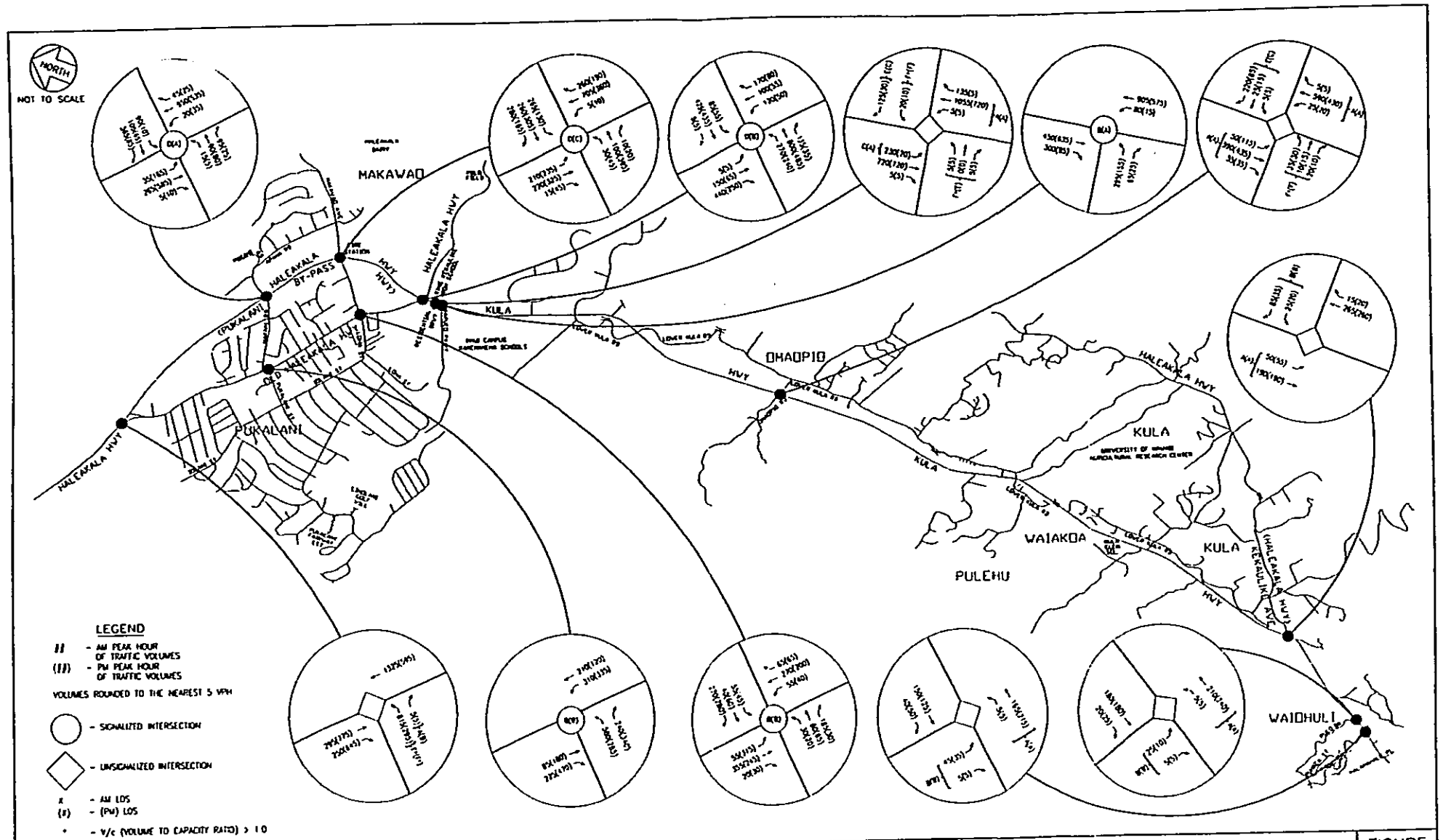
Install a traffic signal system at the Haleakala Highway/Old Haleakala Highway (Western Intersection). As mentioned earlier, a review of 24-hour traffic count data collected in 2001 indicates that traffic volumes at this intersection meet the four-hour warrant for the installation of a traffic signal system as described in the MUTCD-2000. Interconnect and synchronize this traffic signal system with the planned traffic signal system at the Haleakala Highway/Makani Road intersection, and existing traffic signal systems along Haleakala Highway at Makawao Avenue and the Five Trees Junction. With the installation of a traffic signal

system, the intersection will operate overall at LOS F during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All movements will operate at LOS D or better except for northbound left-turn and westbound through traffic which will operate at LOS F during the AM peak hour of traffic.

The results shown in Table 3 assume a traffic signal system phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are served by separate traffic signal phases. It may be possible to allow these two movements to proceed through the intersection simultaneously if accommodated in the design for this intersection, since the additional westbound lane on Haleakala Highway resulting from roadway widening would originate by providing a receiving lane for northbound left-turn traffic from Old Haleakala Highway. In this case, the westbound through vehicles would not be controlled by the traffic signal and would be allowed to proceed continuously. This alternate signal phasing would result in the intersection operating overall at LOS A during the AM and PM peak hours of traffic with all individual movements operating at LOS D or better.

Kula Highway/Omaopio Road

A traffic signal system will most likely be warranted at this intersection. With the installation of a traffic signal system, the Kula Highway/Omaopio Road intersection will operate overall at LOS B during the AM and PM peak hours of traffic. All individual movements will operate at LOS D or better.



HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

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BASE YEAR 2007 SCENARIO A
TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE
5

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Table 3
LOS at Study Intersections
Base Year 2007 Scenario A

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (Western Intersection)						
NB LT	--	F	F*	F*	--	--
NB RT	--	B	A	B	--	--
Haleakala Highway/Old Haleakala Highway (Western Intersection, signalized)						
NB LT	--	--	--	--	F*	C
WB TH	--	--	--	--	F*	B
EB TH	--	--	--	--	B	A
Overall	--	--	--	--	F*	B
Haleakala Highway/Makani Road						
NB LT/TH	E	F*	--	--	--	--
NB RT	A	B	--	--	--	--
SB LT/TH	F*	F*	--	--	--	--
SB RT	F*	B	--	--	--	--
WB LT	A	A	--	--	--	--
EB LT	A	A	--	--	--	--
Haleakala Highway/Makani Road (signalized)						
NB LT/TH	--	--	C	C	--	--
NB RT	--	--	C	C	--	--
SB LT/TH	--	--	C	C	--	--
SB RT	--	--	E	C	--	--
WB LT	--	--	A	A	--	--
WB TH/RT	--	--	D	A	--	--
EB LT	--	--	B	A	--	--
EB TH/RT	--	--	A	A	--	--
Overall	--	--	D	A	--	--

*V/c (volume to capacity ratio) > 1.0

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Table 3 (continued)
LOS at Study Intersections
Base Year 2007 Scenario A

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Makawao Avenue						
NB LT	B	B	C	B	--	--
NB TH	B	C	C	C	--	--
NB RT	B	A	B	A	--	--
SB LT	D	D	E	D	--	--
SB TH	B	B	C	B	--	--
SB RT	B	A	B	A	--	--
WB LT	C	C	D	C	--	--
WB TH	C	C	D	C	--	--
WB RT	B	C	C	C	--	--
EB LT	D	C	E	D	--	--
EB TH	B	B	B	B	--	--
EB RT	B	B	B	B	--	--
Overall	C	C	D	C	--	--
Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)						
NB LT	C	C	D	C	--	--
NB TH	C	B	D	B	--	--
SB LT	C	C	D	C	--	--
SB TH	B	B	C	B	--	--
SB RT	B	B	B	B	--	--
WB LT/TH	C	C	D	C	--	--
EB LT/TH	C	C	C	C	--	--
Overall	C	B	D	B	--	--

*V/c (volume to capacity ratio) > 1.0

Table 3 (continued)
LOS at Study Intersections
Base Year 2007 Scenario A

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Pukalani Street						
NB LT	C	B	C	B	--	--
NB RT	A	B	A	B	--	--
WB LT	C	B	B	B	--	--
WB TH	B	A	B	A	--	--
EB TH	C	B	B	B	--	--
EB RT	A	A	A	A	--	--
Overall	C	B	B	B	--	--
Old Haleakala Highway/Makawao Avenue/Loha Street						
NB LT/TH/RT	B	B	C	B	--	--
SB LT/TH	B	B	B	B	--	--
SB RT	C	C	C	C	--	--
WB LT/TH/RT	B	B	B	B	--	--
EB LT	A	A	A	A	--	--
EB TH/RT	A	A	A	A	--	--
Overall	B	B	B	B	--	--
Kula Highway/KKHS Driveway/Residential Driveway						
NB LT/TH	A	A	A	A	--	--
SB LT	B	A	C	A	--	--
WB LT	F	E	F*	F	--	--
WB RT	C	C	E	C	--	--
EB LT/TH/RT	F	E	F*	E	--	--
Kula Highway/Aapueo Parkway						
NB LT	A	A	--	--	--	--
EB LT	F*	F*	--	--	--	--
EB RT	B	B	--	--	--	--

*V/c (volume to capacity ratio) > 1.0

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Table 3 (continued)
LOS at Study Intersections
Base Year 2007 Scenario A

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kula Highway/Aapueo Parkway (signalized)						
NB LT	--	--	A	A	--	--
NB TH	--	--	C	A	--	--
SB TH	--	--	B	B	--	--
SB RT	--	--	A	A	--	--
EB LT	--	--	C	C	--	--
EB RT	--	--	C	C	--	--
Overall	--	--	B	A	--	--
Kula Highway/Omaoplo Road						
NB LT/TH/RT	A	A	A	A	--	--
SB LT/TH/RT	A	A	A	A	--	--
WB LT/TH/RT	C	C	E	C	--	--
EB LT/TH/RT	F	E	F*	F	--	--
Kula Highway/Omaoplo Road (signalized)						
NB LT/TH/RT	--	--	--	--	B	A
SB LT/TH/RT	--	--	--	--	B	B
WB LT/TH/RT	--	--	--	--	C	C
EB LT/TH/RT	--	--	--	--	C	C
Overall	--	--	--	--	B	B
Kula Highway/Kekaulike Avenue						
SB LT/TH	A	A	A	A	--	--
WB LT/RT	B	B	B	B	--	--
Kula Highway/Pueo Drive						
NB LT/TH	A	A	A	A	--	--
EB LT/RT	A	B	B	B	--	--
Kula Highway/Lauie Drive						
NB LT/TH	A	A	A	A	--	--
EB LT/RT	B	B	B	B	--	--

*V/c (volume to capacity ratio) > 1.0

B. Scenario B

1. Developments Included in Traffic Projections

The following are descriptions of other known future developments near the Project that are not currently under construction but may be completed by Year 2007. Traffic generated by developments included in Scenario A and traffic generated by the following known future developments are included in the traffic projections for Scenario B.

a. Kulamalu Project

Based on discussions with the developer of the Kulamalu project, the following is assumed to be constructed by Year 2007: a county park of approximately 9.3 acres, 12-dwelling unit single-family Kulamalu Hilltop Subdivision, Kulamalu Mauka Subdivision and Phase 3 of the Kulamalu Commercial Subdivision. Peak hour vehicular trips generated by these projects were estimated by applying appropriate trip generation rates in Trip Generation, 6th Edition, published by the Institute of Transportation Engineers (ITE). It is unknown at this time exactly what type of developments will be constructed within the Kulamalu Mauka Subdivision and Phase 3 of the Kulamalu Commercial Subdivision, which are both planned to consist of office and commercial uses. The Kulamalu Mauka Subdivision and Phase 3 of the Kulamalu Commercial Subdivision were assumed to consist of a mix of 25 percent office and 75 percent retail by floor area (17,420 square feet (SF) of office space and 52,250 SF of retail space in the Kulamalu Mauka Subdivision, and 44,260 SF of office space and 132,780 SF of retail space in Phase 3 of the Kulamalu Commercial Subdivision) for the purpose of estimating background traffic for this study.

In addition, the University of Hawaii Institute for Astronomy (IFA) Advanced Technology Center (Phase 1) will be relocated to the Kulamalu project. The Advanced Technology and Research Center (Phase 2), also part of the IFA, is anticipated to be

constructed on an adjacent property to the relocated Advanced Technology Center. At the time of this writing, Phase 1 is anticipated to be completed in 2005 and Phase 2 is anticipated to be completed in 2006. Vehicular trips generated by the Advanced Technology Center and Advanced Technology and Research Center during the AM and PM peak hours of traffic were obtained from the Traffic Impact Analysis Report for the Institute for Astronomy Advanced Technology Center (Phase 1) and Advanced Technology and Research Center (Phase 2) by Austin, Tsutsumi and Associates, dated January 15, 2004.

The Kulamalu Assisted Living/Skilled Nursing Facility, with 102 beds, and the Kulamalu Adult Day Care Center, which is estimated to have approximately 70 clients, are anticipated to be completed in 2006 as part of the Kulamalu development. Vehicular trips generated by the Kulamalu Assisted Living/Skilled Nursing Facility and Adult Day Care Center during the AM and PM peak hours of traffic were obtained from the Traffic Impact Analysis Report for the Kulamalu Assisted Living/Skilled Nursing Facility and Adult Day Care Center by Austin, Tsutsumi and Associates, dated January 28, 2004.

b. Kualono Subdivision

The Kualono Subdivision will be located off of Old Haleakala Highway just west of the Five Trees Junction, and will consist of approximately 49 single-family house lots and a 9.232-acre park. Construction of the roadways and infrastructure for the Kualono Subdivision is anticipated to be completed by the first quarter of 2005 after which owners of the house lots can begin construction of individual single-family homes at their leisure. Vehicular trips generated by the Kualono Subdivision were obtained from the Traffic Impact Analysis Report for the Kualono Subdivision by Austin, Tsutsumi and Associates, Inc., dated December 1, 2003.

c. **Upcountry Town Center**

Maui Land and Pineapple Company has proposed to develop the Upcountry Town Center, which will consist of a mix of retail, office, industrial and residential uses, on the triangular parcel of land bordered by Haleakala Highway, Old Haleakala Highway and Makawao Avenue. The Upcountry Town Center is currently anticipated to be completed in Year 2006 based on available information. Peak hour trips generated by the Upcountry Town Center were obtained from the Traffic Impact Assessment for the Upcountry Town Center by Parsons Brinckerhoff Quade & Douglas, dated March 2002.

Table 4 shows the trips generated during the peak hours of traffic by the known future developments near the Project that will or may be completed by Year 2007 excluding the Project.

2. **Planned Roadway Improvements**

As previously mentioned, installation of traffic signal systems at the Haleakala Highway/Makani Road intersection and Kula Highway/Aapueo Parkway intersection is assumed to be completed by the base year. Also, the widening of Haleakala Highway to four (4) lanes from Hana Highway to Old Haleakala Highway (Western Intersection) and discontinuation of the AM contraflow operation on Haleakala Highway is assumed to be completed by the base year.

3. **Traffic Operations Without Project-Generated Traffic**

The LOS analysis assumes that drivers behave according to traffic controls and does not account for delays caused by vehicles on Kula Highway yielding to vehicles turning into and out of the KKHS driveway and vehicles turning out of Aapueo Parkway during the AM peak hour of traffic. If drivers continue to behave inconsistently with traffic controls, northbound through vehicles on Kula Highway will experience LOS F conditions in the vicinity of KKHS and Aapueo Parkway during the 20-minute period before the start of the KKHS school day (8:00 AM).

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Table 4
Base Year 2007 Scenario B
Peak Hour Trips Generated by Known Future Developments Near the Project

	AM Peak Hour		PM Peak Hour	
	Enter	Exit	Enter	Exit
Expansion of Kamehameha Schools Maui Campus (to include grades K-12)	218	145	80	455
Kulamalu Residence Lots Unit 1 Subdivision (210 remaining lots)	124	50	59	31
Keokea Farm Lots (88 lots)	97	20	21	12
Kulamalu County Park (9.3 Acres)	3	1	2	4
Kulamalu Hilltop Subdivision (12 units)	4	14	10	6
Kulamalu Mauka Subdivision	41	6	75	159
Phase 3 of the Kulamalu Commercial Subdivision	86	12	170	303
Institute for Astronomy Advanced Technology Center	21	10	14	10
Institute for Astronomy Advanced Technology and Research Center	55	11	10	57
Kulamalu Skilled Nursing Facility (102 beds)	11	6	8	12
Kulamalu Adult Day Care Center (70 clients)	82	75	75	82
Kualono Subdivision (49 lots and park)	14	34	38	24
Upcountry Town Center	268	91	377	552
Total	864	475	883	1297

Known developments that have been recently completed or are currently under construction

Described below are the Base Year 2007 Scenario B traffic conditions without traffic generated by the Project. Analysis indicates traffic at the study intersections will operate at LOS D or better except at the following locations. Figure 6 shows the traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic for

Base Year 2007 Scenario B. Table 5 summarizes the LOS at the study intersections for Base Year 2007 Scenario B.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

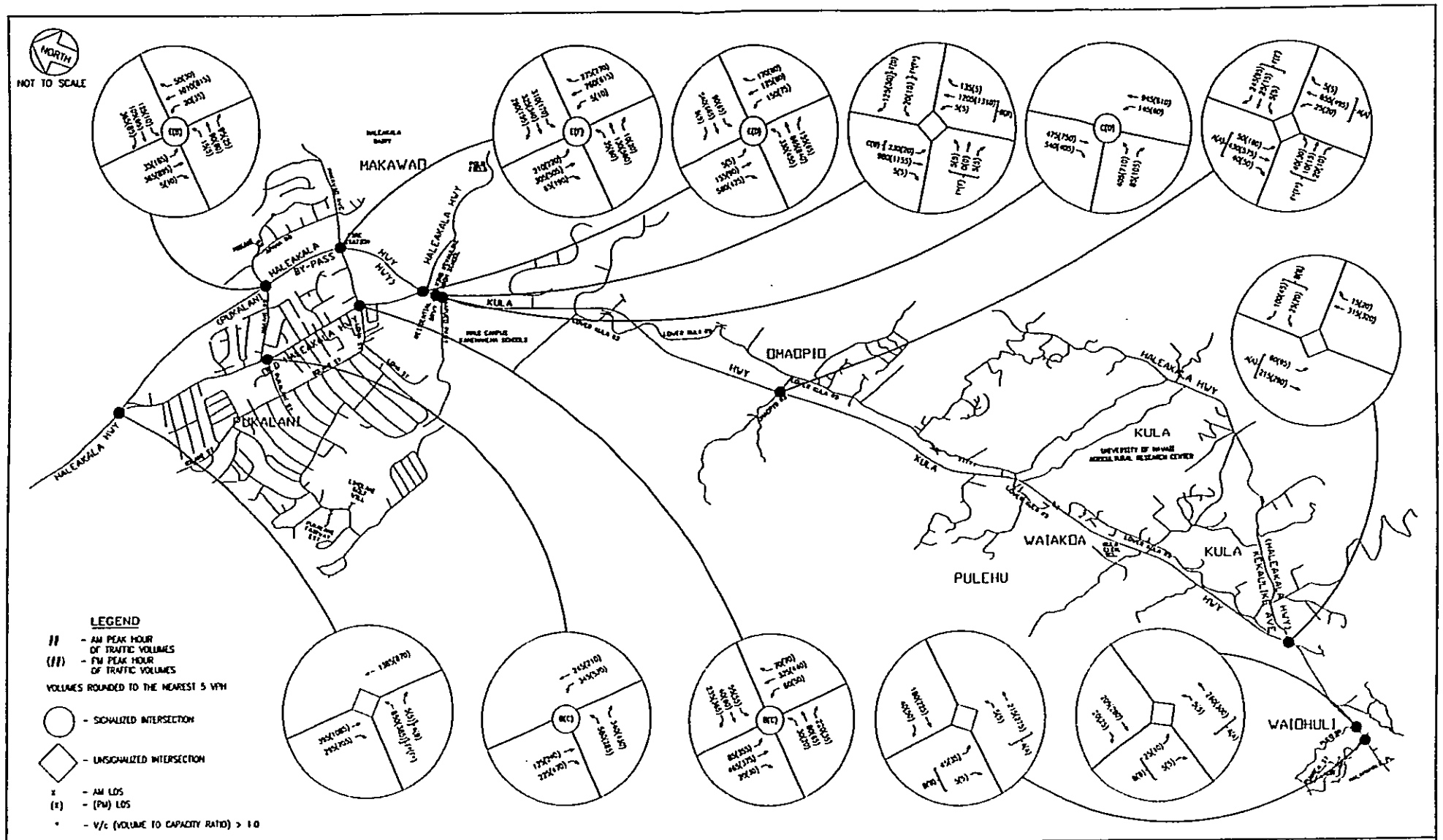
According to the current roadway design from SDOT, the additional westbound lane on Haleakala Highway provided by the widening will originate as the receiving lane for northbound left-turn traffic from Old Haleakala Highway at its western intersection with Haleakala Highway. As an unsignalized intersection, northbound left-turn traffic will operate at LOS F during the AM and PM peak hours of traffic.

Haleakala Highway/Makani Road

With the installation of a traffic signal system, this intersection will operate overall at LOS E during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. Traffic in the southbound shared left-turn/through lane will operate at LOS E during the AM peak hour of traffic. The southbound right-turn and eastbound left-turn will operate at LOS F during the AM peak hour of traffic.

Haleakala Highway/Makawao Avenue

This signalized intersection will operate overall at LOS E during the AM peak hour of traffic and LOS F during the PM peak hour of traffic. Northbound through traffic will operate at LOS E during the PM peak hour of traffic. The southbound left-turn, westbound left-turn, and eastbound left-turn will operate at LOS F during the AM and PM peak hours of traffic. Westbound through traffic will operate at LOS E during the AM and PM peak hours of traffic.



HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

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BASE YEAR 2007 SCENARIO B
TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE
6

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Table 5
LOS at Study Intersections
Base Year 2007 Scenario B

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (Western Intersection)						
NB LT	--	F	F*	F*	--	--
NB RT	--	B	A	B	--	--
Haleakala Highway/Old Haleakala Highway (Western Intersection, signalized)						
NB LT	--	--	--	--	E*	B
WB TH	--	--	--	--	F*	B
EB TH	--	--	--	--	C	B
Overall	--	--	--	--	E	B
Haleakala Highway/Makani Road						
NB LT/TH	E	F*	--	--	--	--
NB RT	A	B	--	--	--	--
SB LT/TH	F*	F*	--	--	--	--
SB RT	F*	B	--	--	--	--
WB LT	A	A	--	--	--	--
EB LT	A	A	--	--	--	--
Haleakala Highway/Makani Road (signalized)						
NB LT/TH	--	--	D	D	B	C
NB RT	--	--	D	D	B	C
SB LT/TH	--	--	E	D	B	C
SB RT	--	--	F	D	C	C
WB LT	--	--	B	A	B	A
WB TH/RT	--	--	E	B	C	A
EB LT	--	--	F	B	B	A
EB TH/RT	--	--	B	A	B	A
Overall	--	--	E	B	C	A

*V/c (volume to capacity ratio) > 1.0

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Table 5 (continued)
LOS at Study Intersections
Base Year 2007 Scenario B

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Makawao Avenue						
NB LT	B	B	D	D	D	E
NB TH	B	C	D	E	D	E
NB RT	B	A	D	C	C	B
SB LT	D	D	F	F*	D	E
SB TH	B	B	D	D	C	C
SB RT	B	A	C	C	B	B
WB LT	C	C	F	F	D	E
WB TH	C	C	E	E	D	E
WB RT	B	C	D	D	B	D
EB LT	D	C	F	F	D	E
EB TH	B	B	C	C	C	D
EB RT	B	B	C	C	B	C
Overall	C	C	E	F	C	D
Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)						
NB LT	C	C	F	E	D	C
NB TH	C	B	E	C	C	B
SB LT	C	C	F	E	D	C
SB TH	B	B	E	E	D	C
SB RT	B	B	D	B	C	B
WB LT/TH	C	C	F	E	C	C
EB LT/TH	C	C	D	D	C	C
Overall	C	B	E	D	C	C
Old Haleakala Highway/Pukalani Street						
NB LT	C	B	C	D	--	--
NB RT	A	B	A	C	--	--
WB LT	C	B	C	D	--	--
WB TH	B	A	B	A	--	--
EB TH	C	B	C	B	--	--
EB RT	A	A	A	A	--	--
Overall	C	B	B	C	--	--

*V/c (volume to capacity ratio) > 1.0

Table 5 (continued)
LOS at Study Intersections
Base Year 2007 Scenario B

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Makawao Avenue/Loha Street						
NB LT/TH/RT	B	B	C	B	--	--
SB LT/TH	B	B	B	B	--	--
SB RT	C	C	C	C	--	--
WB LT/TH/RT	B	B	C	C	--	--
EB LT	A	A	A	A	--	--
EB TH/RT	A	A	A	A	--	--
Overall	B	B	B	C	--	--
Kula Highway/KKHS Driveway/Residential Driveway						
NB LT/TH	A	A	B	B	B	B
SB LT	B	A	C	B	C	B
WB LT	F	E	F*	F*	F*	F
WB RT	C	C	F	D	C	C
EB LT/TH/RT	F	E	F*	F	F	F
Kula Highway/Aapueo Parkway						
NB LT	A	A	--	--	--	--
EB LT	F*	F*	--	--	--	--
EB RT	B	B	--	--	--	--
Kula Highway/Aapueo Parkway (signalized)						
NB LT	--	--	B	F	A	B
NB TH	--	--	D	C	B	B
SB TH	--	--	B	E	B	C
SB RT	--	--	A	A	A	A
EB LT	--	--	D	E	C	C
EB RT	--	--	C	B	C	B
Overall	--	--	C	D	B	B
Kula Highway/Omaopio Road						
NB LT/TH/RT	A	A	A	A	--	--
SB LT/TH/RT	A	A	A	A	--	--
WB LT/TH/RT	C	C	F	E	--	--
EB LT/TH/RT	F	E	F*	F*	--	--

*V/c (volume to capacity ratio) > 1.0

Table 5 (continued)
LOS at Study Intersections
Base Year 2007 Scenario B

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kula Highway/Omaopio Road (signalized)						
NB LT/TH/RT	--	--	--	--	B	A
SB LT/TH/RT	--	--	--	--	B	B
WB LT/TH/RT	--	--	--	--	C	C
EB LT/TH/RT	--	--	--	--	C	C
Overall	--	--	--	--	B	B
Kula Highway/Kekaulike Avenue						
SB LT/TH	A	A	A	A	--	--
WB LT/RT	B	B	B	B	--	--
Kula Highway/Pueo Drive						
NB LT/TH	A	A	A	A	--	--
EB LT/RT	A	B	B	B	--	--
Kula Highway/Laule Drive						
NB LT/TH	A	A	A	A	--	--
EB LT/RT	B	B	B	B	--	--

*V/c (volume to capacity ratio) > 1.0

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)

This signalized intersection will operate overall at LOS E during the AM peak hour of traffic and LOS D during the PM peak hour of traffic. The northbound left-turn, southbound left-turn and traffic in the westbound shared left-turn/through lane will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. Northbound through traffic will operate at LOS E during the AM peak hour of traffic. Southbound through traffic will operate at LOS E during the AM and PM peak hours of traffic.

Kula Highway/KKHS Driveway/Residential Driveway

Westbound left-turn traffic from KKHS will operate at LOS F during the AM and PM peak hours of traffic. Westbound right-turn traffic from KKHS will operate at LOS F during the AM peak hour of traffic. Eastbound traffic on the shared driveway approach will operate at LOS F during the AM and PM peak hours of traffic. However, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic. The projected Base Year 2007 traffic volumes at this intersection during the AM and PM peak hours of traffic do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Aapueo Parkway

With the installation of a traffic signal system, this intersection will operate overall at LOS C during the AM peak hour of traffic and LOS D during the PM peak hour of traffic. The northbound left-turn will operate at LOS F during the PM peak hour of traffic. Southbound through traffic and the eastbound left-turn will operate at LOS E during the PM peak hour of traffic.

Kula Highway/Omaoplo Road

As an unsignalized intersection, traffic on the shared westbound approach will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. Traffic on the shared eastbound approach will operate at LOS F during the AM and PM peak hours of traffic. Base Year 2007 traffic volumes are likely to warrant a traffic signal system at this intersection.

4. **Traffic Mitigation Measures**

In addition to the traffic mitigation measures proposed to accommodate projected traffic volumes for Base Year 2007 Scenario A, the following traffic mitigation measures are proposed to accommodate

projected traffic volumes for Base Year 2007 Scenario B without Project-generated traffic. Table 5 summarizes the LOS analysis for Base Year 2007 Scenario B with traffic mitigation measures for the affected intersections.

Haleakala Highway

Widen Haleakala Highway to four (4) lanes, two (2) lanes in each direction, from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction. Together with the widening that is currently under construction, Haleakala Highway would provide four (4) lanes from Hana Highway to the Five Trees Junction.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

With installation of a traffic signal system, which is proposed as a mitigative measure for Base Year 2007 Scenario A, and widening of Haleakala Highway as previously described, the Haleakala Highway/Old Haleakala Highway (Western Intersection) will operate overall at LOS E during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. All individual movements will operate at LOS D or better except for the northbound left-turn, which will operate at LOS E and westbound through traffic, which will operate at LOS F during the AM peak hour of traffic.

The results shown in Table 5 assume a traffic signal system phasing such that the signal will stop all the westbound through traffic on Haleakala Highway and assign the right-of-way to the northbound left-turn traffic on Old Haleakala Highway (i.e. creating a separate phase for each approach). It may be possible to allow these movements to proceed through the intersection simultaneously if a median acceleration lane is provided to receive the northbound left-turning vehicles from Old Haleakala Highway. In this case, vehicles turning left from northbound Old Haleakala Highway onto westbound Haleakala Highway would accelerate to

the posted speed limit and then merge with traffic on Haleakala Highway further west of the intersection. The westbound through vehicles would not be controlled by the traffic signal system and would be allowed to proceed continuously. This alternate signal phasing would result in the Haleakala Highway/Old Haleakala Highway (Western Intersection) operating overall at LOS B during the AM peak hour of traffic and LOS A during the PM peak hour of traffic with all individual movements operating at LOS D or better. The merging of vehicles that made a left-turn from Old Haleakala Highway with westbound through vehicles on Haleakala Highway will operate at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic.

Haleakala Highway/Makani Road

With widening of Haleakala Highway as described above, the Haleakala Highway/Makani Road intersection will operate overall at LOS C during the AM peak hour of traffic and LOS A during the PM peak hour of traffic with all individual movements operating at LOS D or better.

Haleakala Highway/Makawao Avenue

Modify the traffic signal system at the Haleakala Highway/ Makawao Avenue intersection to provide a protected left-turn phase to serve left-turns from Makawao Avenue. Due to the high volume of northbound through vehicles (560 vehicles) during the PM peak hour of traffic, a protected left-turn phase would be beneficial for the Makawao Avenue southbound left-turn. Lengthening the right-turn and left-turn lanes and thus widening of the roadway on the Makawao Avenue approaches will be required. With a protected left-turn phase for the minor street approaches and proposed widening of Haleakala Highway as previously described, the Haleakala Highway/Makawao Avenue intersection will operate overall at LOS C during the AM peak hour of traffic and LOS D during the PM peak hour of traffic. All individual movements will operate at LOS D or better except for

the northbound, southbound, westbound and eastbound left-turn, and northbound and westbound through traffic, which will operate at LOS E during the PM peak hour of traffic.

Kula Highway

Widen Kula Highway to four (4) lanes, two (2) lanes in each direction, from the Five Trees Junction to Aapueo Parkway. At the Five Trees Junction, the two (2) northbound lanes on Haleakala Highway will receive traffic from the two (2) northbound lanes on Kula Highway, and the two (2) southbound lanes on Kula Highway will receive traffic from the two (2) southbound lanes on Haleakala Highway.

Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)

Adjust the traffic signal system timing at the Five Trees Junction to be coordinated with the modified traffic signal at the Haleakala Highway/Makawao Avenue intersection. With adjustment of the traffic signal timing, and proposed widening of Haleakala Highway and Kula Highway as previously described, the Five Trees Junction will operate overall at LOS C during the AM and PM peak hours of traffic. All individual movements will operate at LOS D or better.

Kula Highway/KKHS Driveway/Residential Driveway

With the proposed widening of Kula Highway as previously described, all individual movements at the Kula Highway/KKHS Driveway/Residential Driveway intersection will operate at LOS D or better except for the following. Westbound left-turn traffic from KKHS will operate at LOS F during the AM and PM peak hours of traffic. Eastbound traffic on the shared driveway approach will operate at LOS F during the AM and PM peak hours of traffic. However, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic. The projected

Base Year 2007 AM and PM peak hours of traffic volumes at this intersection with the widening of Kula Highway do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Aapueo Parkway

Provide an additional left-turn lane on the eastbound Aapueo Parkway approach to Kula Highway. Due to the high volume of eastbound vehicles turning left (710 vehicles) during the PM peak hour of traffic, two (2) eastbound left-turn lanes would be beneficial for traffic on the Aapueo Parkway approach. Roadway widening on the Aapueo Parkway approach will be required to accommodate this improvement. The proposed additional northbound lane on Kula Highway could originate by receiving vehicles turning left from the Aapueo Parkway eastbound approach. The proposed additional southbound lane on Kula Highway could terminate by connecting to the exclusive southbound right-turn lane at Aapueo Parkway. With double left-turn lanes on the eastbound Aapueo Parkway approach to Kula Highway and proposed widening of Kula Highway as previously described, the Kula Highway/Aapueo Parkway intersection will operate overall at LOS B during the AM and PM peak hours of traffic. All individual movements will operate at LOS D or better.

IV. PROJECT-GENERATED TRAFFIC

A. Trip Generation

Trip generation rates were calculated based on the existing number of occupied lots in the Kula Residence Lots, Unit 1 Subdivision and existing traffic volumes entering and exiting the subdivision. This method was used since the Project is the same type of development as the Kula Residence Lots, Unit 1 Subdivision. For both the Project and the Kula Residence Lots, Unit 1 Subdivision, owners of house lots are responsible for construction of their own homes. Table 6 summarizes the calculated trip generation rates.

Table 6

Trip Generation Rates

	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
	Enter	Exit	Enter	Exit
Kula Residence Lots, Unit 1 Subdivision (per developed lot)	0.20	0.23	0.24	0.14

The Project will consist of rural subdivisions with a total of 99 lots that will be developed as three (3) Hawaiian Home Lands Subdivisions named: Waiohuli Hikina, Waiohuli Uka, and Waiohuli Lot 134. From Kula Highway, Pueo Drive, Waiohuli Lot 134 Roadway and Laule Drive are expected to be used to access 15 lots, 4 lots and 80 lots within the Project, respectively. Table 7 summarizes the trips generated by the Project for each of these roadways.

Table 7

Peak Hour Trip Generation for the Project

Roadway Access	AM Peak Hour of Traffic		PM Peak Hour of Traffic	
	Enter	Exit	Enter	Exit
Pueo Drive (15 lots)	3	3	4	2
Waiohuli Lot 134 Roadway (4 lots)	1	1	1	1
Laule Drive (80 lots)	16	18	19	11
Total (99 lots)	20	22	24	14

B. Project and Roadway Access

The Waiohuli Lot 134 Roadway will be constructed as part of the Project and will serve as the only access for the Waiohuli Lot 134 Subdivision. In addition, several new roadways that will be used to access the Waiohuli Hikina Subdivision and Waiohuli Uka Subdivision will be constructed off of Pueo Drive and Laule Drive, which are the existing main roadways within the Kula Residence Lots, Unit 1 Subdivision.

C. **Traffic Distribution and Assignment**

Trips generated by the Project during the AM peak hour of traffic were assigned to the roadway network based on traffic projections for conditions without the contraflow operation on Haleakala Highway. Trips generated by the Project during the PM peak hour of traffic were assigned to the roadway network based on existing traffic patterns. Figure 7 shows the total traffic assignment for the Project.

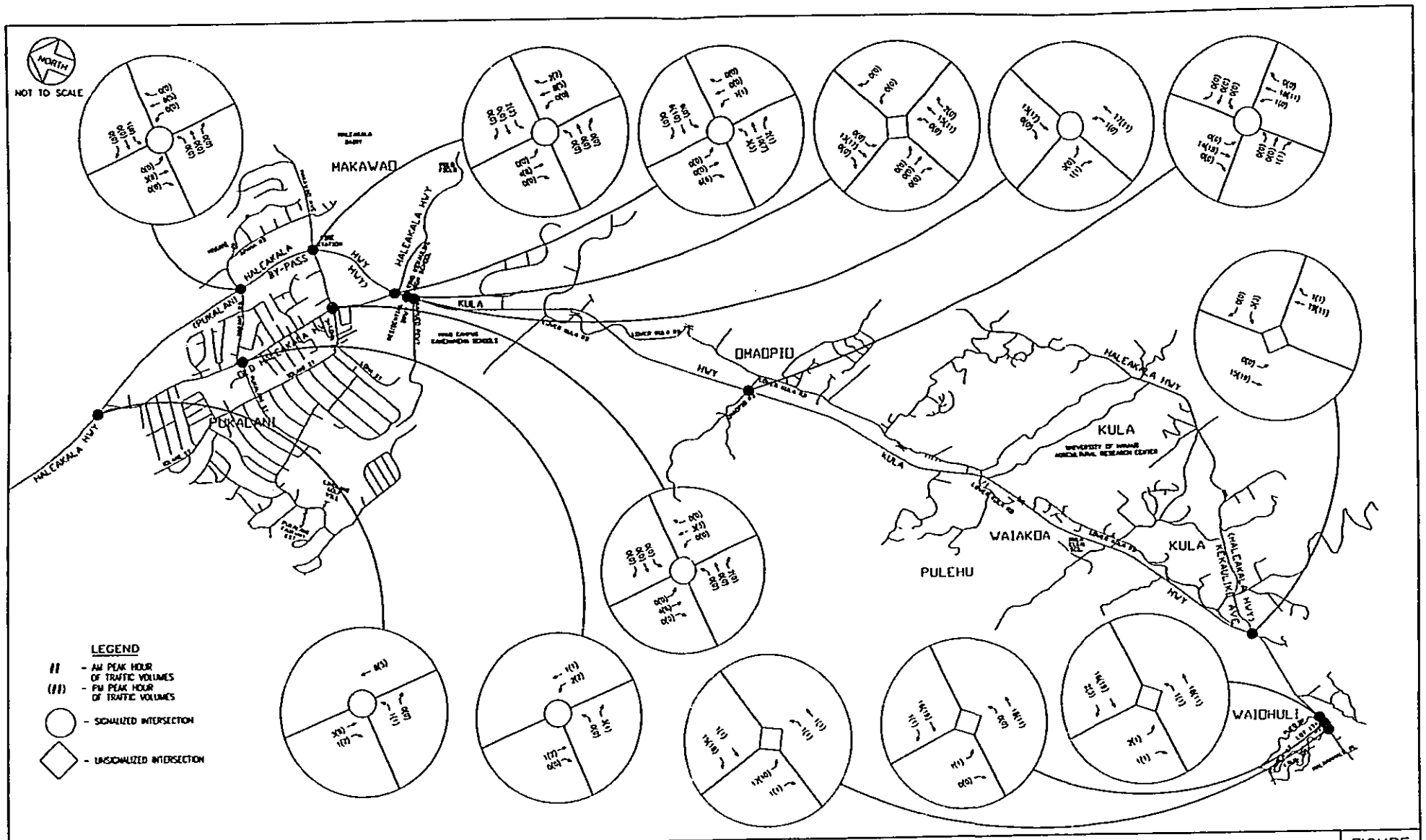
V. TRAFFIC OPERATIONS FOR YEAR 2007 WITH PROJECT-GENERATED TRAFFIC

A. Scenario A

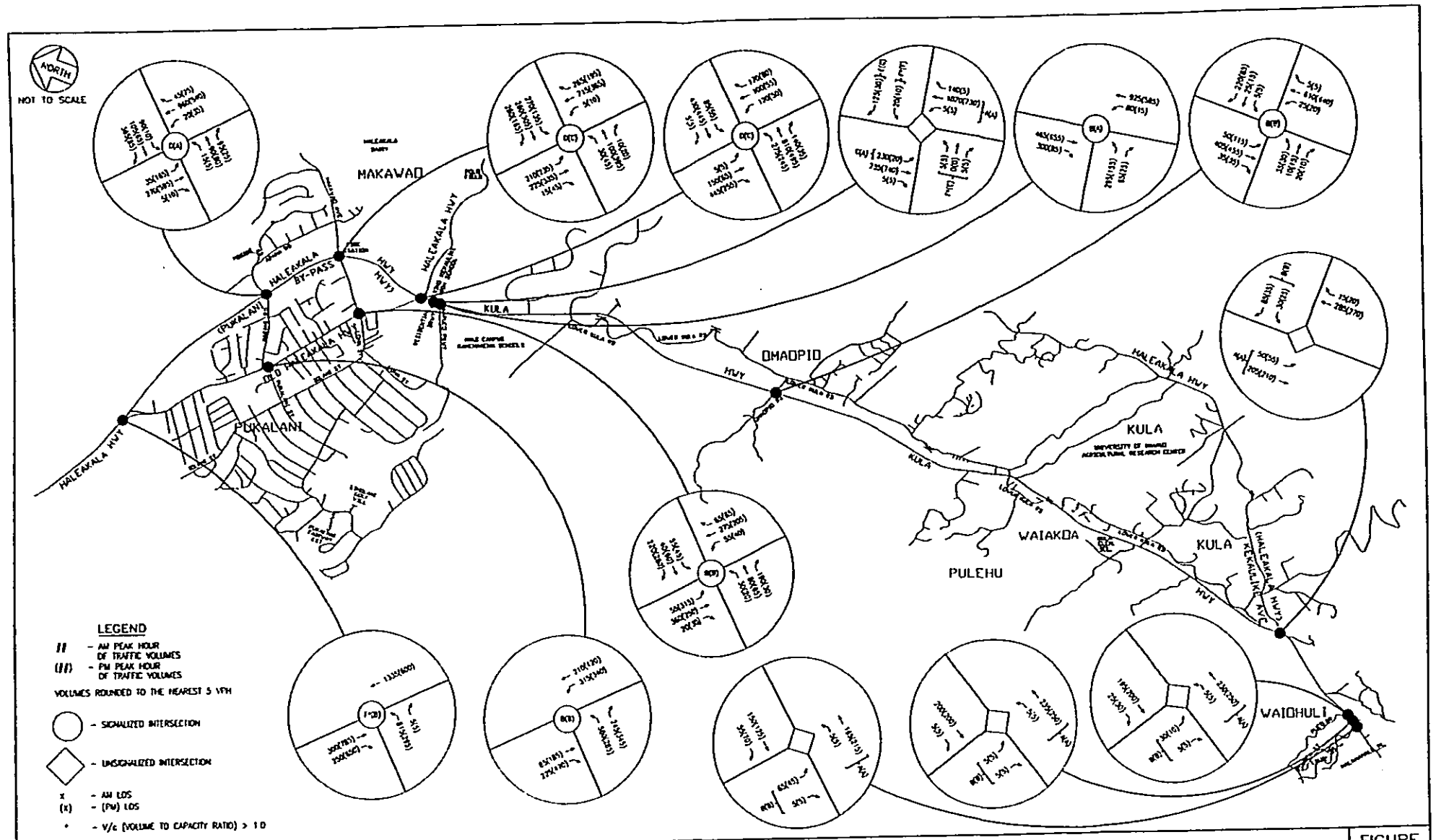
The following section describes Year 2007 Scenario A traffic conditions with Project-generated traffic. As previously mentioned, Scenario A includes traffic generated by only known developments near the Project that have been recently completed or are currently under construction.

The LOS analysis assumes that drivers behave according to traffic controls and does not account for delays caused by vehicles on Kula Highway yielding to vehicles turning into and out of the KKHS driveway and vehicles turning out of Aapueo Parkway during the AM peak hour of traffic. If drivers continue to behave inconsistently with traffic controls, northbound through vehicles on Kula Highway will experience LOS F conditions in the vicinity of KKHS and Aapueo Parkway during the 20-minute period before the start of the KKHS school day (8:00 AM).

Traffic generated by the Project was added to traffic volumes for Base Year 2007 Scenario A to estimate traffic volumes for Year 2007 Scenario A with the Project. Analysis of Year 2007 Scenario A traffic conditions with Project-generated traffic indicates that traffic will operate similar to conditions for Base Year 2007 Scenario A conditions. With implementation of the mitigative measures for Base Year 2007 Scenario A, traffic at the study intersections will operate at LOS D or better except at the following locations. Figure 8 shows the traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic for Year 2007 Scenario A with the Project. Table 8 summarizes the LOS at the study intersections for Year 2007 Scenario A with the Project.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII PROJECT-GENERATED TRAFFIC	FIGURE 7



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HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

YEAR 2007 SCENARIO A WITH THE PROJECT
TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE
8

Table 8
LOS at Study Intersections
Year 2007 Scenario A with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (Western Intersection)								
NB LT	--	F	F*	F*	--	--	--	--
NB RT	--	B	A	B	--	--	--	--
Haleakala Highway/Old Haleakala Highway (Western Intersection, signalized)								
NB LT	--	--	--	--	F*	C	F*	C
WB TH	--	--	--	--	F*	B	F*	B
EB TH	--	--	--	--	B	A	B	A
Overall	--	--	--	--	F*	B	F*	B
Haleakala Highway/Makani Road								
NB LT/TH	E	F*	--	--	--	--	--	--
NB RT	A	B	--	--	--	--	--	--
SB LT/TH	F*	F*	--	--	--	--	--	--
SB RT	F*	B	--	--	--	--	--	--
WB LT	A	A	--	--	--	--	--	--
EB LT	A	A	--	--	--	--	--	--
Haleakala Highway/Makani Road (signalized)								
NB LT/TH	--	--	C	C	--	--	C	C
NB RT	--	--	C	C	--	--	C	C
SB LT/TH	--	--	C	C	--	--	C	C
SB RT	--	--	E	C	--	--	E	C
WB LT	--	--	A	A	--	--	A	A
WB TH/RT	--	--	D	A	--	--	D	A
EB LT	--	--	B	A	--	--	B	A
EB TH/RT	--	--	A	A	--	--	A	A
Overall	--	--	D	A	--	--	D	A

*V/c (volume to capacity ratio) > 1.0

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Table 8 (continued)
LOS at Study Intersections
Year 2007 Scenario A with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Makawao Avenue								
NB LT	B	B	C	B	--	--	C	B
NB TH	B	C	C	C	--	--	C	C
NB RT	B	A	B	A	--	--	B	A
SB LT	D	D	E	D	--	--	E	E
SB TH	B	B	C	B	--	--	C	B
SB RT	B	A	B	A	--	--	B	A
WB LT	C	C	D	C	--	--	D	C
WB TH	C	C	D	C	--	--	E	C
WB RT	B	C	C	C	--	--	C	C
EB LT	D	C	E	D	--	--	E	D
EB TH	B	B	B	B	--	--	B	B
EB RT	B	B	B	B	--	--	B	B
Overall	C	C	D	C	--	--	D	C
Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)								
NB LT	C	C	D	C	--	--	D	C
NB TH	C	B	D	B	--	--	D	B
SB LT	C	C	D	C	--	--	D	C
SB TH	B	B	C	B	--	--	C	C
SB RT	B	B	B	B	--	--	B	B
WB LT/TH	C	C	D	C	--	--	D	C
EB LT/TH	C	C	C	C	--	--	C	C
Overall	C	B	D	B	--	--	D	C
Old Haleakala Highway/Pukalani Street								
NB LT	C	B	C	B	--	--	C	B
NB RT	A	B	A	B	--	--	A	B
WB LT	C	B	B	B	--	--	B	B
WB TH	B	A	B	A	--	--	B	A
EB TH	C	B	B	B	--	--	B	B
EB RT	A	A	A	A	--	--	A	A
Overall	C	B	B	B	--	--	B	B

*V/c (volume to capacity ratio) > 1.0

Table 8 (continued)
LOS at Study Intersections
Year 2007 Scenario A with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Makawao Avenue/Loha Street								
NB LT/TH/RT	B	B	C	B	--	--	C	B
SB LT/TH	B	B	B	B	--	--	B	B
SB RT	C	C	C	C	--	--	C	C
WB LT/TH/RT	B	B	B	B	--	--	B	B
EB LT	A	A	A	A	--	--	A	A
EB TH/RT	A	A	A	A	--	--	A	A
Overall	B	B	B	B	--	--	B	B
Kula Highway/KKHS Driveway/Residential Driveway								
NB LT/TH	A	A	A	A	--	--	A	A
SB LT	B	A	C	A	--	--	C	A
WB LT	F	E	F*	F	--	--	F*	F
WB RT	C	C	E	C	--	--	E	C
EB LT/TH/RT	F	E	F*	E	--	--	F*	E
Kula Highway/Aapueo Parkway								
NB LT	A	A	--	--	--	--	--	--
EB LT	F*	F*	--	--	--	--	--	--
EB RT	B	B	--	--	--	--	--	--
Kula Highway/Aapueo Parkway (signalized)								
NB LT	--	--	A	A	--	--	A	A
NB TH	--	--	C	A	--	--	C	A
SB TH	--	--	B	B	--	--	B	B
SB RT	--	--	A	A	--	--	A	A
EB LT	--	--	C	C	--	--	C	C
EB RT	--	--	C	C	--	--	C	C
Overall	--	--	B	A	--	--	B	A
Kula Highway/Omaoplo Road								
NB LT/TH/RT	A	A	A	A	--	--	--	--
SB LT/TH/RT	A	A	A	A	--	--	--	--
WB LT/TH/RT	C	C	E	C	--	--	--	--
EB LT/TH/RT	F	E	F*	F	--	--	--	--

*V/c (volume to capacity ratio) > 1.0

Table 8 (continued)
LOS at Study Intersections
Year 2007 Scenario A with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kula Highway/Omaopio Road (signalized)								
NB LT/TH/RT	--	--	--	--	B	A	B	A
SB LT/TH/RT	--	--	--	--	B	B	B	B
WB LT/TH/RT	--	--	--	--	C	C	C	C
EB LT/TH/RT	--	--	--	--	C	C	C	C
Overall	--	--	--	--	B	B	B	B
Kula Highway/Kekaulike Avenue								
SB LT/TH	A	A	A	A	--	--	A	A
WB LT/RT	B	B	B	B	--	--	B	B
Kula Highway/Pueo Drive								
NB LT/TH	A	A	A	A	--	--	A	A
EB LT/RT	A	B	B	B	--	--	B	B
Kula Highway/Waiohuli Lot 134 Roadway								
NB LT/TH	--	--	--	--	--	--	A	A
EB LT/RT	--	--	--	--	--	--	B	B
Kula Highway/Laule Drive								
NB LT/TH	A	A	A	A	--	--	A	A
EB LT/RT	B	B	B	B	--	--	B	B

*V/c (volume to capacity ratio) > 1.0

Haleakala Highway/Old Haleakala Highway (Western Intersection)

With the installation of a traffic signal system, the intersection will operate overall at LOS F during the AM peak hour of traffic and LOS B during the PM peak hour of traffic. The northbound left-turn and westbound through traffic will operate at LOS F during the AM peak hour of traffic. It may be possible to allow these two movements to proceed through the intersection simultaneously if accommodated in the design for this intersection, since the additional westbound lane on Haleakala Highway resulting from roadway widening would originate by providing a receiving lane for northbound left-turn traffic from Old Haleakala Highway.

In this case, the westbound through vehicles would not be controlled by the traffic signal and would be allowed to proceed continuously. This alternate signal phasing would result in the intersection operating overall at LOS A during the AM and PM peak hours of traffic with all individual movements operating at LOS D or better.

Haleakala Highway/Makani Road

With the installation of a traffic signal system, this intersection will operate overall at LOS D during the AM peak hour of traffic and LOS A during the PM peak hour of traffic. Traffic in the southbound right-turn lane will operate at LOS E during the AM peak hour of traffic.

Haleakala Highway/Makawao Avenue

This signalized intersection will operate overall at LOS D during the AM peak hour of traffic and LOS C during the PM peak hour of traffic. The southbound left-turn lane will operate at LOS E during the AM and PM peak hours of traffic. The westbound through traffic and eastbound left-turn lane will operate at LOS E during the AM peak hour of traffic.

Kula Highway/KKHS Driveway/Residential Driveway

As an unsignalized intersection, westbound left-turn traffic from KKHS will operate at LOS F during the AM and PM peak hours of traffic. Westbound right-turn traffic from KKHS will operate at LOS E during the AM peak hour of traffic. Eastbound traffic on the shared driveway approach will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. However, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic. The projected traffic volumes at this intersection during the AM and PM peak hours of traffic do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Waiohuli Lot 134 Roadway

This intersection will have the capacity to serve demands with single-lane shared approaches. All individual movements will operate at LOS B or better.

B. Scenario B

The following section describes Year 2007 Scenario B traffic conditions with Project-generated traffic. As previously mentioned, Scenario B includes traffic from Scenario A plus traffic generated by the known future developments near the Project that may be completed by Year 2007.

The LOS analysis assumes that drivers behave according to traffic controls and does not account for delays caused by vehicles on Kula Highway yielding to vehicles turning into and out of the KKHS driveway and vehicles turning out of Aapueo Parkway during the AM peak hour of traffic. If drivers continue to behave inconsistently with traffic controls, northbound through vehicles on Kula Highway will experience LOS F conditions in the vicinity of KKHS and Aapueo Parkway during the 20-minute period before the start of the KKHS school day (6:00 AM).

Traffic generated by the Project was added to traffic volumes for Base Year 2007 Scenario B to estimate traffic volumes for Year 2007 Scenario B with the Project. Analysis of Year 2007 Scenario B traffic conditions with Project-generated traffic indicates that traffic will operate similar for Base Year 2007 Scenario B conditions. With implementation of the mitigative measures for Base Year 2007 Scenario A and Base Year 2007 Scenario B, such as widening portions of Haleakala Highway and Kula Highway to four (4) lanes, traffic at the study intersections will operate at LOS D or better except at the following locations. Figure 9 shows the traffic volumes and LOS at the study intersections during the AM and PM peak hours of traffic for Year 2007 Scenario B with the Project. Table 9 summarizes the LOS at the study intersections for Year 2007 Scenario B with the Project.

Haleakala Highway/Old Haleakala Highway (Western Intersection)

With the installation of a traffic signal system and widening of Haleakala Highway, the intersection will operate overall at LOS E during the AM peak hour of traffic and LOS B during the PM peak hour of traffic.

Northbound left-turn traffic will operate at LOS E and westbound through traffic will operate at LOS F during the AM peak hour of traffic.

The results shown in Table 9 assume a traffic signal system phasing such that the signal will stop all the westbound through traffic on Haleakala Highway and assign the right-of-way to the northbound left-turn traffic on Old Haleakala Highway (i.e. creating a separate phase for each approach). It may be possible to allow these movements to proceed through the intersection simultaneously if a median acceleration lane is provided to receive the northbound left-turning vehicles from Old Haleakala Highway. In this case, vehicles turning left from northbound Old Haleakala Highway onto westbound Haleakala Highway would accelerate to the posted speed limit and then merge with traffic on Haleakala Highway further west of the intersection. The westbound through vehicles would not be controlled by the traffic signal system and would be allowed to proceed continuously. This alternate signal phasing would result in the intersection operating overall at LOS B during the AM peak hour of traffic and LOS A during the PM peak hour of traffic with all individual movements operating at LOS D or better. The merging of vehicles that made a left-turn from Old Haleakala Highway with westbound through vehicles on Haleakala Highway will operate at LOS C during the AM peak hour of traffic and LOS B during the PM peak hour of traffic.

Haleakala Highway/Makawao Avenue

With a protected left-turn phase for the minor street approaches and widening of Haleakala Highway, the intersection will operate overall at LOS C during the AM peak hour of traffic and LOS D during the PM peak hour of traffic. All individual movements will operate at LOS D or better except for the northbound, southbound, westbound and eastbound left-turn, and northbound and westbound through traffic, which will continue to operate at LOS E during the PM peak hour of traffic.

Kula Highway/KKHS Driveway/Residential Driveway

With widening of Kula Highway, the westbound left-turn from KKHS will operate at LOS F during the AM and PM peak hours of traffic. Eastbound traffic on the shared driveway approach will operate at LOS F during the AM and PM peak hours of traffic. However, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic. The projected traffic volumes at this intersection during the AM and PM peak hours of traffic for Year 2007 with the Project do not meet the peak hour warrant for the installation of a traffic signal system as described in the MUTCD-2000.

Kula Highway/Waiohuli Lot 134 Roadway

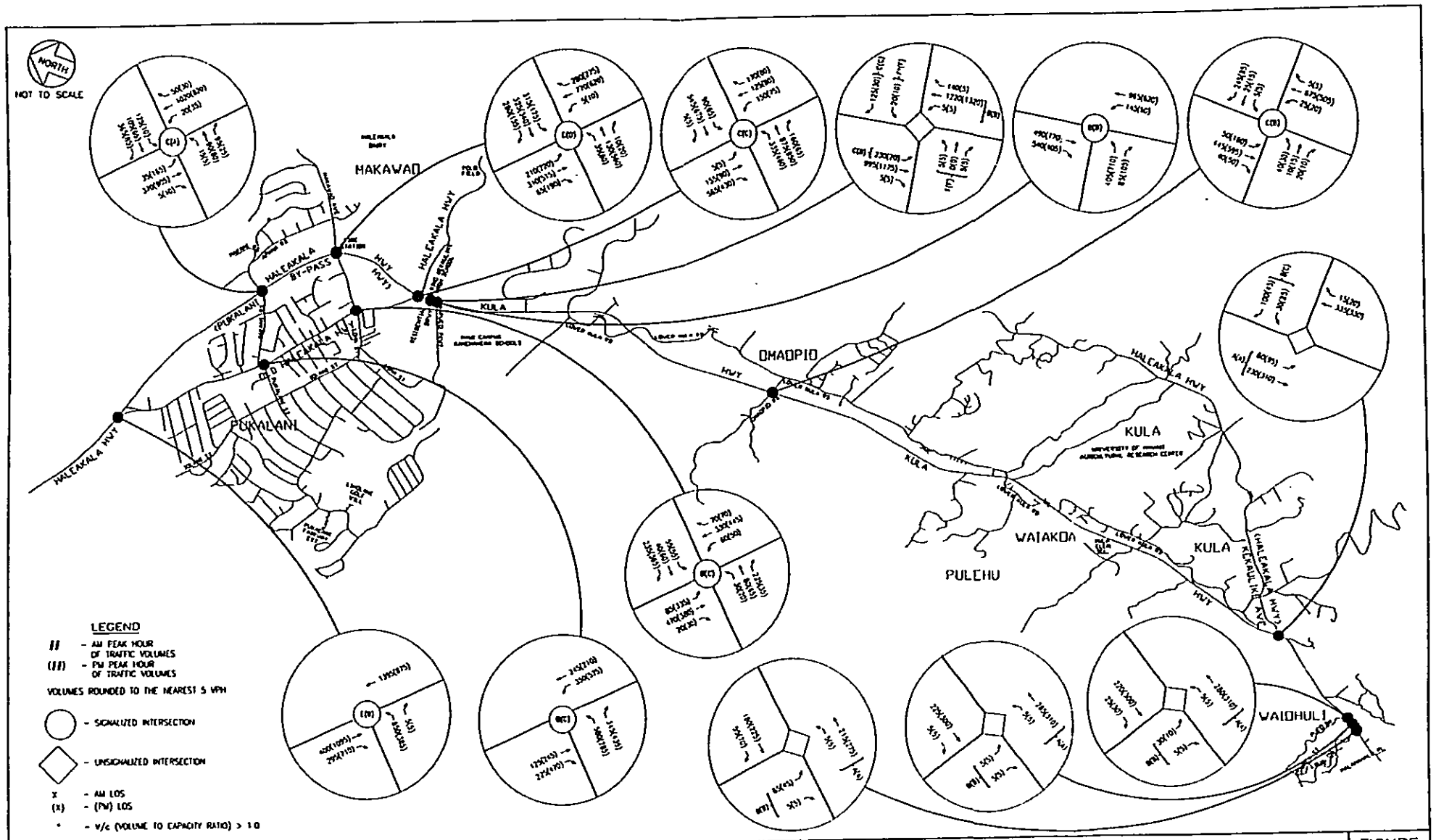
This intersection will have the capacity to serve demands with single-lane shared approaches. All individual movements will operate at LOS B or better.

VI. CONCLUSIONS

A. Existing

1. The northbound left-turn at the Haleakala Highway/Old Haleakala Highway (Western Intersection) currently operates at LOS F during the PM peak hour of traffic. Review of 24-hour traffic volumes collected in 2001 by SDOT at this intersection indicates the installation of a traffic signal system is warranted.

2. Some movements at the Haleakala Highway/Makani Road intersection currently operate at LOS E or LOS F during the AM and PM peak hours of traffic. Review of 24-hour traffic volumes collected in 2001 by SDOT at this location indicates the installation of a traffic signal system is warranted. A traffic signal system at this intersection is planned for construction by SDOT and for the purposes of this study assumed to be operational by Year 2007.



HAWAIIAN HOME LANDS SUBDIVISIONS AT WAIOHULI

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

YEAR 2007 SCENARIO B WITH THE PROJECT
TRAFFIC VOLUMES AND LEVEL OF SERVICE

FIGURE 9

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Table 9
LOS at Study Intersections
Year 2007 Scenario B with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Old Haleakala Highway (Western Intersection)								
NB LT	--	F	F*	F*	--	--	--	--
NB RT	--	B	A	B	--	--	--	--
Haleakala Highway/Old Haleakala Highway (Western Intersection, signalized)								
NB LT	--	--	--	--	E*	B	E*	B
WB TH	--	--	--	--	F*	B	F*	B
EB TH	--	--	--	--	C	B	C	B
Overall	--	--	--	--	E	B	E	B
Haleakala Highway/Makani Road								
NB LT/TH	E	F*	--	--	--	--	--	--
NB RT	A	B	--	--	--	--	--	--
SB LT/TH	F*	F*	--	--	--	--	--	--
SB RT	F*	B	--	--	--	--	--	--
WB LT	A	A	--	--	--	--	--	--
EB LT	A	A	--	--	--	--	--	--
Haleakala Highway/Makani Road (signalized)								
NB LT/TH	--	--	D	D	B	C	B	C
NB RT	--	--	D	D	B	C	B	C
SB LT/TH	--	--	E	D	B	C	B	C
SB RT	--	--	F	D	C	C	C	C
WB LT	--	--	B	A	B	A	B	A
WB TH/RT	--	--	E	B	C	A	C	A
EB LT	--	--	F	B	B	A	B	A
EB TH/RT	--	--	B	A	B	A	B	A
Overall	--	--	E	B	C	A	C	A

*V/c (volume to capacity ratio) > 1.0

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Table 9 (continued)
LOS at Study Intersections
Year 2007 Scenario B with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Haleakala Highway/Makawao Avenue								
NB LT	B	B	D	D	D	E	D	E
NB TH	B	C	D	E	D	E	D	E
NB RT	B	A	D	C	C	B	C	C
SB LT	D	D	F	F*	D	E	D	E
SB TH	B	B	D	D	C	C	C	C
SB RT	B	A	C	C	B	B	B	B
WB LT	C	C	F	F	D	E	D	E
WB TH	C	C	E	E	D	E	D	E
WB RT	B	C	D	D	B	D	B	D
EB LT	D	C	F	F	D	E	D	E
EB TH	B	B	C	C	C	D	C	D
EB RT	B	B	C	C	B	C	B	C
Overall	C	C	E	F	C	D	C	D
Haleakala Highway/Kula Highway/Old Haleakala Highway (Five Trees Junction)								
NB LT	C	C	F	E	D	C	D	C
NB TH	C	B	E	C	C	B	C	B
SB LT	C	C	F	E	D	C	D	C
SB TH	B	B	E	E	D	C	D	C
SB RT	B	B	D	B	C	B	C	B
WB LT/TH	C	C	F	E	C	C	C	C
EB LT/TH	C	C	D	D	C	C	C	C
Overall	C	B	E	D	C	C	C	C
Old Haleakala Highway/Pukalani Street								
NB LT	C	B	C	D	--	--	C	D
NB RT	A	B	A	C	--	--	A	C
WB LT	C	B	C	D	--	--	D	D
WB TH	B	A	B	A	--	--	B	A
EB TH	C	B	C	B	--	--	C	B
EB RT	A	A	A	A	--	--	A	A
Overall	C	B	B	C	--	--	B	C

*V/c (volume to capacity ratio) > 1.0

Table 9 (continued)
LOS at Study Intersections
Year 2007 Scenario B with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Old Haleakala Highway/Makawao Avenue/Loha Street								
NB LT/TH/RT	B	B	C	B	--	--	C	B
SB LT/TH	B	B	B	B	--	--	B	B
SB RT	C	C	C	C	--	--	C	C
WB LT/TH/RT	B	B	C	C	--	--	C	D
EB LT	A	A	A	A	--	--	A	A
EB TH/RT	A	A	A	A	--	--	A	A
Overall	B	B	B	C	--	--	B	C
Kula Highway/KKHS Driveway/Residential Driveway								
NB LT/TH	A	A	B	B	B	B	B	B
SB LT	B	A	C	B	C	B	C	B
WB LT	F	E	F*	F*	F*	F	F*	F
WB RT	C	C	F	D	C	C	C	C
EB LT/TH/RT	F	E	F*	F	F	F	F	F
Kula Highway/Aapueo Parkway								
NB LT	A	A	--	--	--	--	--	--
EB LT	F*	F*	--	--	--	--	--	--
EB RT	B	B	--	--	--	--	--	--
Kula Highway/Aapueo Parkway (signalized)								
NB LT	--	--	B	F	A	B	A	B
NB TH	--	--	D	C	B	B	C	B
SB TH	--	--	B	E	B	C	B	C
SB RT	--	--	A	A	A	A	A	A
EB LT	--	--	D	E	C	C	C	C
EB RT	--	--	C	B	C	B	C	B
Overall	--	--	C	D	B	B	B	B
Kula Highway/Omaopio Road								
NB LT/TH/RT	A	A	A	A	--	--	--	--
SB LT/TH/RT	A	A	A	A	--	--	--	--
WB LT/TH/RT	C	C	F	E	--	--	--	--
EB LT/TH/RT	F	E	F*	F*	--	--	--	--

*V/c (volume to capacity ratio) > 1.0

Table 9 (continued)
LOS at Study Intersections
Year 2007 Scenario B with the Project

	Existing		Base Year 2007		Base Year 2007 with Mitigative Measures		Year 2007 with Project	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Kula Highway/Omaopio Road (signalized)								
NB LT/TH/RT	--	--	--	--	B	A	B	A
SB LT/TH/RT	--	--	--	--	B	B	B	C
WB LT/TH/RT	--	--	--	--	C	C	C	C
EB LT/TH/RT	--	--	--	--	C	C	C	C
Overall	--	--	--	--	B	B	C	B
Kula Highway/Kekaulike Avenue								
SB LT/TH	A	A	A	A	--	--	A	A
WB LT/RT	B	B	B	B	--	--	B	C
Kula Highway/Pueo Drive								
NB LT/TH	A	A	A	A	--	--	A	A
EB LT/RT	A	B	B	B	--	--	B	B
Kula Highway/Walohuli Lot 134 Roadway								
NB LT/TH	--	--	--	--	--	--	A	A
EB LT/RT	--	--	--	--	--	--	B	B
Kula Highway/Laule Drive								
NB LT/TH	A	A	A	A	--	--	A	A
EB LT/RT	B	B	B	B	--	--	B	B

*V/c (volume to capacity ratio) > 1.0

3. The westbound left-turn and traffic on the eastbound shared driveway approach at the Kula Highway/KKHS Driveway/Residential Driveway intersection currently operate at LOS E or LOS F during the AM and PM peak hours of traffic. Existing traffic volumes at this intersection do not warrant installation of a traffic signal system. It is not uncommon, however, for a low volume side street to experience long delays especially when trying to cross or execute a left-turn onto a major regional facility such as Kula Highway. In addition, few vehicles use the shared driveway approach, five (5) vehicles and three (3) vehicles during the AM and PM peak hours, respectively.

4. The eastbound left-turn at the Kula Highway/Aapueo Parkway intersection operates at LOS F during the AM and PM peak hours of traffic. Existing traffic volumes at this intersection warrant the installation of a traffic signal system. A traffic signal at this intersection is currently in the design process and for the purposes of this study assumed to be operational by the Year 2007.

5. At the Kula Highway/Omaopio Road intersection, traffic on the shared eastbound approach operates at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic. A review of 24-hour traffic count data collected in 2001 by SDOT indicates the installation of a traffic signal system is not warranted.

B. Base Year 2007 Scenario A

The following are the conclusions of the traffic study for Base Year 2007 Scenario A without traffic generated by the proposed Project.

1. Known developments near the Project that have been recently completed or are currently under construction could potentially generate approximately 494 and 192 total trips during the AM and PM peak hours of traffic, respectively.

2. Installation of a traffic signal system at the Haleakala Highway/Old Haleakala Highway (Western Intersection) will be required to accommodate the anticipated demand. With installation of a traffic signal system at this intersection, northbound left-turn and westbound through traffic will operate at LOS F during the AM peak hour of traffic. This is assuming phasing such that the westbound through traffic on Haleakala Highway and northbound left-turn traffic on Old Haleakala Highway are served by separate traffic signal phases. It may be possible to allow these movements to proceed through the intersection simultaneously if accommodated in the design for this intersection since the additional westbound lane on Haleakala Highway resulting from roadway widening would originate by providing a receiving lane for northbound left-turn traffic from Old Haleakala Highway. Using

this alternate signal phasing would result in all individual movements at the Haleakala Highway/Old Haleakala Highway (Western Intersection) operating at LOS D or better during the AM and PM peak hours of traffic.

3. Haleakala Highway will be approaching capacity within the study area with some movements at the Makani Road and Makawao Avenue intersections operating at LOS E during the AM peak hour of traffic even with the installation of a traffic signal system at the Makani Road intersection.

4. At the Kula Highway/KKHS Driveway/Residential Driveway intersection, the westbound left-turn from the KKHS driveway approach will operate at LOS F during the AM and PM peak hours of traffic. In addition, eastbound traffic on the shared residential driveway approach will operate at LOS F during the AM peak hour of traffic and LOS E during the PM peak hour of traffic, and westbound right-turn traffic from KKHS will operate at LOS E during the AM peak hour of traffic. Traffic volumes at this intersection are not likely to warrant installation of a traffic signal system. It is not uncommon, however, for a low volume side street to experience long delays especially when trying to cross or execute a left-turn onto a major regional facility such as Kula Highway. In addition, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic.

5. With the installation of a traffic signal system, all individual movements at the Kula Highway/Aapueo Parkway intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

6. A traffic signal system at the Kula Highway/Omaopio Road intersection is likely to be warranted. Monitor traffic volumes at this intersection and install a traffic signal system when warranted. With the installation of a traffic signal system, all individual movements at the Kula Highway/Omaopio Road intersection will

operate at LOS D or better during the AM and PM peak hours of traffic.

C. **Base Year 2007 Scenario B**

The following are the conclusions of the traffic study for Base Year 2007 Scenario B without traffic generated by the proposed Project.

1. Construction of the known future developments near the Project that will or may be completed by the base year could potentially generate approximately 1,339 and 2,180 total trips during the AM and PM peak hours of traffic, respectively.

2. Haleakala Highway will be operating at overcapacity conditions between the Haleakala Highway/Old Haleakala Highway (Western Intersection) and Five Trees Junction with some movements at the Haleakala Highway/Old Haleakala Highway (Western Intersection), Halekala Highway/Makani Road Intersection, Haleakala Highway/Makawao Avenue Intersection and the Five Trees Junction operating at LOS E or LOS F during the AM and PM peak hours of traffic.

3. With installation of a traffic signal system at the Haleakala Highway/Old Haleakala Highway (Western Intersection) as proposed for Base Year 2007 Scenario A, and widening of Haleakala Highway from three (3) to four (4) lanes (two (2) lanes in each direction) from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction, the northbound left-turn at the Haleakala Highway/Old Haleakala Highway (Western Intersection) will operate at LOS E and westbound through traffic will operate at LOS F during the AM peak hour of traffic. This is assuming phasing such that the traffic signal will stop all the westbound through traffic on Haleakala Highway and assign the right-of-way to the northbound left-turn traffic on Old Haleakala Highway (i.e. creating a separate phase for each approach). It may be possible to allow these movements to proceed through the intersection simultaneously if a median acceleration lane is provided

to receive the northbound left-turning vehicles from Old Haleakala Highway. In this case, vehicles turning left from northbound Old Haleakala Highway onto westbound Haleakala Highway would accelerate to the posted speed limit and then merge with traffic on Haleakala Highway further west of the intersection. The westbound through vehicles would not be controlled by the traffic signal system and would be allowed to proceed continuously. Using this alternate signal phasing would result in all individual movements at the Haleakala Highway/Old Haleakala Highway (Western Intersection) operating at LOS D or better during the AM and PM peak hours of traffic. With widening of Haleakala Highway to four (4) lanes as described earlier and installation of a traffic signal system, all individual movements at the Haleakala Highway/Makani Road will operate at LOS D or better during the AM and PM peak hours of traffic.

4. Due to the high volume of northbound through vehicles (560 vehicles) during the PM peak hour of traffic at the Haleakala Highway/Makawao Avenue Intersection, a full eight-phase traffic signal will be required. With the widening of Haleakala Highway as described earlier and provision of a protected left-turn phase for traffic on the minor street approaches, some movements at the Haleakala Highway/Makawao Avenue Intersection will operate at LOS E during the PM peak hour of traffic. Lengthening the right-turn and left-turn lanes and thus widening of the roadway on the Makawao Avenue approaches will be required.

5. The Kula Highway/Aapueo Parkway intersection will be operating at overcapacity conditions. Due to the high volume of eastbound vehicles turning left from Aapueo Parkway (710 vehicles) during the PM peak hour of traffic, an additional left-turn lane on the eastbound Aapueo Parkway approach to Kula Highway and widening of this approach will be required. Widening of Kula Highway would be required to receive vehicles turning left from Aapueo Parkway onto Kula Highway. With widening of Kula Highway from two (2) to four (4)

lanes (two (2) lanes in each direction) from the Five Trees Junction to the Kula Highway/Aapueo Parkway intersection and installation of a traffic signal system, all individual movements at the Kula Highway/Aapueo Parkway intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

6. With widening of Haleakala Highway and widening of Kula Highway as described earlier, and adjustment of the traffic signal timing at the Five Trees Junction to be coordinated with the modified signal at the Haleakala Highway/Makawao Avenue intersection, all individual movements at the Five Trees Junction will operate at LOS D or better during the AM and PM peak hours of traffic.

7. With widening of Kula Highway to four lanes as described earlier, the Kula Highway/KKHS Driveway/Residential Driveway intersection westbound left-turn from the KKHS driveway approach and eastbound traffic on the shared residential driveway approach will operate at LOS F during the AM and PM peak hours of traffic. Traffic volumes at this intersection are not likely to warrant installation of a traffic signal system. It is not uncommon, however, for a low volume side street to experience long delays especially when trying to cross or execute a left-turn onto a major regional facility such as Kula Highway. In addition, few vehicles are projected to use the shared driveway approach, ten (10) vehicles during the AM peak hour of traffic and ten (10) vehicles during the PM peak hour of traffic.

9. With the installation of a traffic signal system, as proposed for Base Year 2007 Scenario A, all individual movements at the Kula Highway/Omaopio Road intersection will operate at LOS D or better during the AM and PM peak hours of traffic.

D. Project-Generated Traffic

Development of the Project could potentially generate approximately 42 and 38 total trips during the AM and PM peak hours of traffic, respectively.

E. Year 2007 Scenario A With Project-Generated Traffic

With traffic generated by the proposed Project and traffic generated by only known developments near the Project that have been recently completed or are currently under construction, traffic operations within the study area will be similar to Base Year 2007 Scenario A.

F. Year 2007 Scenario B With Project-Generated Traffic

With traffic generated by the proposed Project and traffic generated by the known future developments near the Project that will or may be completed by the base year, traffic operations within the study area will be similar to Base Year 2007 Scenario B.

VII. RECOMMENDATIONS

A. Base Year 2007 Scenario A

The following are the recommendations of the traffic study without Project-generated traffic and with known developments near the Project that have been recently completed or are currently under construction.

- Install traffic signal systems at the Haleakala Highway/Old Haleakala Highway (Western Intersection) and Haleakala Highway/Makani Road intersection. Interconnect and synchronize these traffic signal systems with existing traffic signal systems along Haleakala Highway at Makawao Avenue and the Five Trees Junction.
- Install a traffic signal system at the Kula Highway/Aapueo Parkway intersection.
- Monitor traffic volumes at the Kula Highway/Omaopio Road intersection and install a traffic signal when warranted.

B. Base Year 2007 Scenario B

In addition to the recommended improvements for Base Year 2007 Scenario A, the following are the recommendations of the traffic study without Project-generated traffic and with the known future developments near the Project that will or may be completed by the base year.

- Widen Haleakala Highway to four (4) lanes, (two (2) lanes in each direction) from the Haleakala Highway/Old Haleakala Highway (Western Intersection) to the Five Trees Junction.
- At the Haleakala Highway/Old Haleakala Highway (Western Intersection), provide a westbound median acceleration lane on Haleakala Highway to receive northbound left-turns from Old Haleakala Highway. Provide a two-phase traffic signal that would stop only the eastbound through traffic on Haleakala Highway and assign the right-of-way to the northbound left-turn from Old Haleakala Highway.
- Revise the traffic signal system at the Haleakala Highway/Makawao Avenue intersection to provide a full eight-phase traffic signal system with a protected left-turn phase for traffic on the minor street approaches. Investigate the need for lengthening the exclusive right-turn and left-turn lanes and thus widening of the roadway on the Makawao Avenue approaches to accommodate the anticipated demand.
- Interconnect and synchronize the traffic signal systems at the Haleakala Highway/Old Haleakala Highway (Western Intersection), Haleakala Highway/Makani Road, Haleakala Highway/Makawao Avenue, and the Five Trees Junction.
- Widen Kula Highway to four (4) lanes, (two (2) lanes in each direction) from the Five Trees Junction to Aapueo Parkway.
- Provide an additional left-turn lane on the eastbound Aapueo Parkway approach to Kula Highway.

C. Year 2007 Scenario A With Project-Generated Traffic

- There are no specific recommendations of the traffic study with traffic generated by the proposed Project and traffic generated by only known developments near the Project that have been recently completed or are currently under construction.

D. Year 2007 Scenario B With Project-Generated Traffic

There are no specific recommendations of the traffic study with traffic generated by the proposed Project and traffic generated by the known future developments near the Project that will or may be completed by the base year.

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3. Austin, Tsutsumi & Associates, Inc., Traffic Impact Analysis Report for the Kulamalu Assisted Living/Skilled Nursing Facility and Adult Day Care Center, January 28, 2004.

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7. Kamehameha Schools Maui Campus Website, http://maui.ksbe.edu.

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9. Phillip Rowell and Associates, Traffic Impact Analysis for Kamehameha Schools Maui Campus, Draft Report, June 2002.

10. State of Hawaii, Department of Transportation, Highways Division, Traffic Survey Data (Individual Stations), Island of Maui, 2001.

11. Transportation Research Board, Highway Capacity Manual – HCM 2000, Special Report 209, 2000.

12. Transportation Research Board, Intersection Channelization Design Guide, National Cooperative Highway Research Program Report 279, 1985.

13. U.S. Department of Transportation, Federal Highway Administration, Manual on Uniform Traffic Control Devices – MUTCD 2000 – Millennium Edition, December 2000, as amended.

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CIVIL ENGINEERS + SURVEYORS

APPENDIX A
TRAFFIC COUNT DATA

Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haloldam
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

Start Time	Southbound Left	Thru	Right	Peds	App. Total	HALEAKALA HWY Westbound Left	Thru	Right	Peds	App. Total	OLD HALEAKALA HWY Northbound Left	Thru	Right	Peds	App. Total	HALEAKALA HWY Eastbound Left	Thru	Right	Peds	App. Total	Int. Total
Factor	15	15	15	15		15	15	15	15		15	15	15	15		15	15	15	15		
06:30 AM	0	0	0	0	0	0	303	0	0	303	136	0	0	0	136	0	0	58	0	58	497
06:45 AM	0	0	0	0	0	0	301	0	0	301	265	0	0	0	265	0	0	101	0	101	667
Total	0	0	0	0	0	0	604	0	0	604	401	0	0	0	401	0	0	159	0	159	1264
07:00 AM	0	0	0	0	0	0	300	0	0	300	250	0	0	0	250	0	0	134	0	134	684
07:15 AM	0	0	0	0	0	0	320	0	0	320	195	0	0	0	195	0	0	147	0	147	662
07:30 AM	0	0	0	0	0	0	252	0	0	252	158	0	0	0	158	0	0	112	1	113	523
07:45 AM	0	0	0	0	0	0	301	0	0	301	116	0	0	0	116	0	0	106	0	106	523
Total	0	0	0	0	0	0	1173	0	0	1173	719	0	0	0	719	0	0	499	1	500	2431
08:00 AM	0	0	0	0	0	0	196	0	0	196	144	0	0	0	144	0	0	118	0	118	460
08:15 AM	0	0	0	0	0	0	167	0	0	167	105	0	0	0	105	0	0	96	0	96	371
Grand Total	0	0	0	0	0	0	2142	0	0	2142	1408	0	0	0	1408	0	0	915	1	916	4488
Apprch %	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		0.0	0.0	99.9	0.1		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	48.0	0.0	0.0	48.0	31.5	0.0	0.0	0.0	31.5	0.0	0.0	20.5	0.0	20.5	

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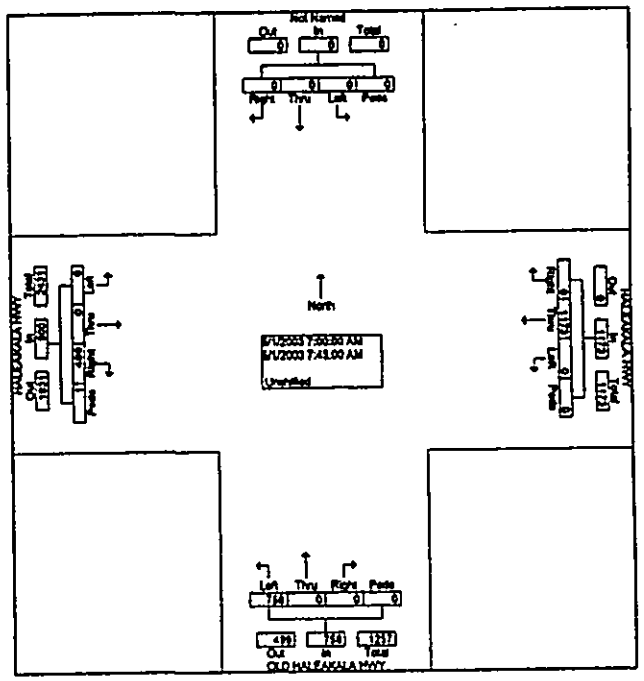
Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haloldam
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

Start Time	Southbound Left	Thru	Right	Peds	App. Total	HALEAKALA HWY Westbound Left	Thru	Right	Peds	App. Total	OLD HALEAKALA HWY Northbound Left	Thru	Right	Peds	App. Total	HALEAKALA HWY Eastbound Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	0	0	0	0	0	1173	0	0	1173	719	0	0	0	719	0	0	499	1	500	2431
Percent	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		0.0	0.0	99.8	0.2		
07:00 Volume	0	0	0	0	0	0	300	0	0	300	250	0	0	0	250	0	0	134	0	134	684
Peak Factor																					0.889
High Int.						07:15 AM															
Volume	0	0	0	0	0	0	320	0	0	320	07:00 AM 250	0	0	0	250	07:15 AM 0	0	147	0	147	
Peak Factor										0.916					0.718					0.650	



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Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haloldpr
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	0	0	0	0	0	0	109	0	0	109	74	0	0	0	74	0	129	99	0	228	411
Total	0	0	0	0	0	0	109	0	0	109	74	0	0	0	74	0	129	99	0	228	411
03:00 PM	0	0	0	0	0	0	139	0	0	139	58	0	0	0	58	0	111	102	0	213	410
03:15 PM	0	0	0	0	0	0	140	0	0	140	58	0	0	0	58	0	143	110	0	251	449
03:30 PM	0	0	0	0	0	0	172	0	0	172	85	0	1	0	86	0	101	143	0	304	562
03:45 PM	0	0	0	0	0	0	186	0	0	186	65	0	1	0	66	0	167	133	0	300	631
Total	0	0	0	0	0	0	617	0	0	617	266	0	2	0	268	0	542	496	0	1077	1962
04:00 PM	0	0	0	0	0	0	133	0	0	133	75	0	1	0	76	0	178	145	0	323	532
04:15 PM	0	0	0	0	0	0	142	0	0	142	66	0	0	0	66	0	176	115	0	321	529
04:30 PM	0	0	0	0	0	0	137	0	0	137	78	0	0	0	78	0	174	180	5	359	572
Grand Total	0	0	0	0	0	0	1138	0	0	1138	557	0	3	0	560	0	1238	1064	5	2308	4006
Apprch %	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		99.5	0.0	0.5	0.0		0.0	53.7	46.1	0.2		
Total %	0.0	0.0	0.0	0.0	0.0	0.0	28.4	0.0	0.0	28.4	13.9	0.0	0.1	0.0	14.0	0.0	30.9	26.6	0.1	57.6	

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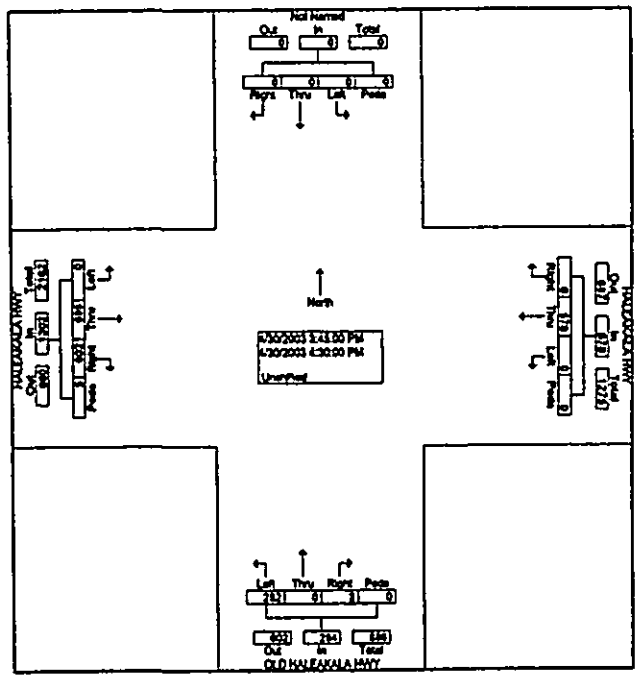
Major Street: Haleakala Hwy
Minor Street: Old Haleakala Hwy
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : haloldpr
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	Southbound					HALEAKALA HWY Westbound					OLD HALEAKALA HWY Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	02:45 PM																				
Volume	0	0	0	0	0	0	578	0	0	578	282	0	2	0	284	0	695	602	5	1303	2164
Percent	0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		99.3	0.0	0.7	0.0		0.0	53.4	46.2	0.4		
04:30 Volume	0	0	0	0	0	0	137	0	0	137	78	0	0	0	78	0	174	180	5	359	572
Peak Factor																					0.948
High Int.						02:45 PM										04:00 PM				04:30 PM	
Volume	0	0	0	0	0	0	166	0	0	166	75	0	1	0	76	0	178	145	0	323	
Peak Factor										0.870					0.934					0.957	



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Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmaka
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	5	8	79	0	90	1	224	1	0	226	10	23	0	0	33	0	0	0	0	0	349
06:45 AM	2	10	60	0	72	9	214	0	0	223	5	29	19	0	51	0	0	0	0	0	346
Total	7	18	139	0	162	10	438	1	0	449	15	44	26	0	86	0	0	0	0	0	700
07:00 AM	13	21	102	1	134	1	211	4	0	216	2	20	31	0	53	0	0	0	0	0	403
07:15 AM	18	20	89	0	127	2	226	15	0	243	3	36	45	0	84	0	0	0	0	0	454
07:30 AM	36	39	101	0	176	5	177	15	0	197	5	34	37	0	76	1	2	0	0	3	452
07:45 AM	12	17	53	0	81	10	202	6	0	218	7	25	19	0	51	1	0	0	0	1	351
Total	79	97	344	1	518	18	816	40	0	874	15	115	132	0	262	2	2	0	0	4	1658
08:00 AM	3	15	42	0	60	2	141	1	0	144	3	13	13	0	29	0	0	0	0	0	233
08:15 AM	6	11	29	0	46	4	125	3	0	132	8	12	11	0	25	0	0	1	0	1	204
Grand Total	95	139	554	1	789	34	1520	45	0	1599	39	184	182	0	406	2	2	1	0	5	2799
Apprch %	11.7	17.7	70.5	0.1		2.1	95.1	2.8	0.0		9.6	45.3	44.8	0.0		40.0	40.0	20.0	0.0		
Total %	3.3	5.0	19.8	0.0	28.1	1.2	54.3	1.6	0.0	57.1	1.4	6.7	6.5	0.0	14.8	0.1	0.1	0.0	0.0	0.2	

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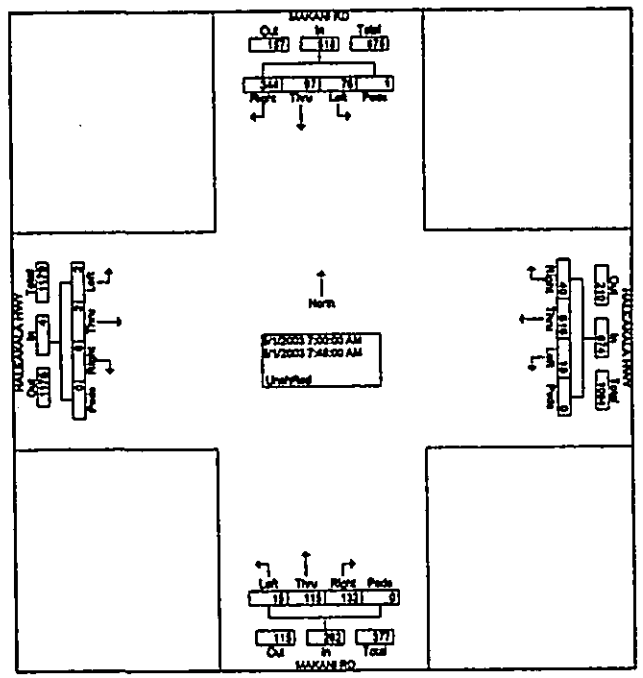
Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmaka
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	75	97	344	1	518	18	816	40	0	874	15	115	132	0	262	2	2	0	0	4	1658
Percent	14.7	18.7	66.4	0.2		2.1	93.4	4.6	0.0		5.7	43.9	50.4	0.0		50.0	50.0	0.0	0.0		
07:15	18	20	89	0	127	2	226	15	0	243	3	36	45	0	84	0	0	0	0	0	454
Volume																					0.933
Peak Factor																					
High Int.	07:30 AM					07:15 AM					07:15 AM					07:30 AM					
Volume	36	39	101	0	176	2	226	15	0	243	3	36	45	0	84	1	2	0	0	3	
Peak Factor					0.736					0.899					0.780					0.333	



Austin Tsutsumi & Associates, Inc.
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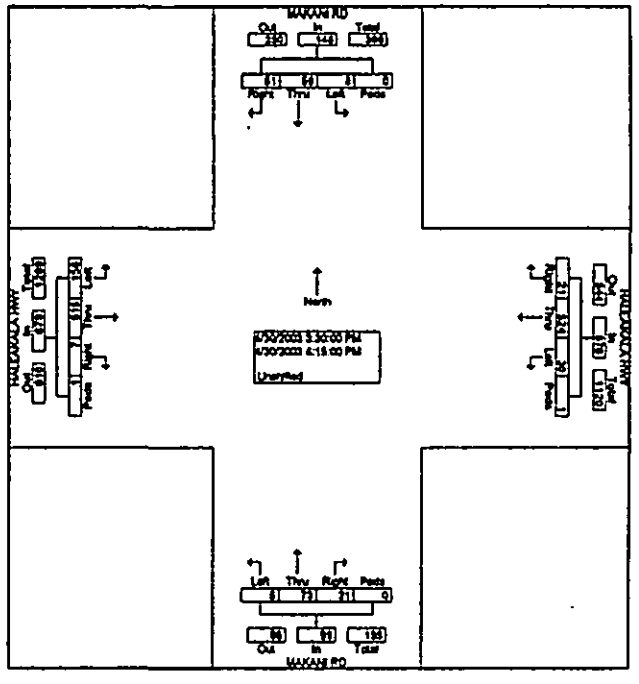
Honolulu, Hawaii 96817
Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Haleakala Hwy
Minor Street: Makani Rd
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmakp
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	8	89	81	0	148	30	824	21	1	878	5	73	21	0	99	154	815	7	1	978	1902
Percent	5.4	39.9	54.7	0.0		3.2	91.8	2.8	0.2		5.1	73.7	21.2	0.0		23.0	75.8	1.0	0.1		
03:30	2	19	24	0	44	7	154	3	1	165	1	16	3	0	20	37	129	1	1	168	397
Volume																					
Peak Factor																					0.948
High Int.	03:30 PM					03:30 PM					04:15 PM					04:00 PM					
Volume	2	19	24	0	44	7	154	3	1	165	2	19	6	0	29	50	133	3	0	186	
Peak Factor					0.841					0.879					0.853					0.913	



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Major Street: Haleakala Hwy
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Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmakp
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKANI RD Southbound					HALEAKALA HWY Westbound					MAKANI RD Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:45 PM	4	23	23	0	54	7	96	5	0	110	0	12	3	0	15	22	106	2	0	132	311
Total	4	23	23	0	54	7	96	5	0	110	0	12	3	0	15	22	106	2	0	132	311
03:00 PM	0	16	26	0	42	5	113	4	0	122	1	13	2	0	16	24	91	2	0	117	297
03:15 PM	4	24	21	0	49	5	109	2	0	116	1	23	2	0	26	24	98	1	0	123	314
03:30 PM	2	18	24	0	44	7	154	3	1	165	1	16	3	0	20	37	129	1	1	168	397
03:45 PM	2	11	20	0	33	8	143	5	0	156	1	22	6	0	29	33	133	1	0	167	384
Total	8	69	91	0	168	25	519	14	1	559	4	74	12	0	90	118	451	5	1	575	1392
04:00 PM	1	15	15	0	31	12	117	7	0	136	1	16	5	0	22	50	133	3	0	186	375
04:15 PM	3	12	22	0	37	3	110	6	0	119	2	19	6	0	29	36	120	2	0	158	343
04:30 PM	2	8	26	0	36	6	154	4	1	165	3	23	4	1	31	48	148	1	0	197	371
Grand Total	18	132	179	0	329	53	946	36	2	1039	10	144	32	1	187	286	885	13	1	1240	2785
Approach %	5.5	40.1	54.4	0.0		5.1	91.2	3.5	0.2		5.3	77.0	17.1	0.5		23.5	77.4	1.0	0.1		
Total %	0.6	4.7	6.4	0.0	11.8	1.9	33.9	1.3	0.1	37.2	0.4	5.2	1.1	0.0	6.7	9.5	34.3	0.5	0.0	44.4	

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Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmwoe
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour	15	15	15	15		15	15	15	15		15	15	15	15		15	15	15	15		
06:30 AM	34	34	68	0	180	0	129	20	0	149	11	34	0	0	45	5	11	1	0	17	371
06:45 AM	49	44	108	0	199	1	111	20	0	132	4	36	1	0	41	8	7	1	0	17	389
Total	87	78	194	0	379	1	240	40	0	281	15	70	1	0	86	14	18	2	0	34	760
07:00 AM	62	67	87	1	217	0	124	48	0	172	5	38	2	0	45	16	15	2	1	34	467
07:15 AM	46	48	64	0	158	3	172	50	0	225	8	63	1	0	72	31	30	3	0	64	519
07:30 AM	73	58	57	0	189	2	144	65	0	211	7	47	4	0	58	23	46	6	0	75	533
07:45 AM	49	74	59	0	182	1	140	64	1	206	7	56	1	0	64	15	15	4	0	34	486
Total	230	248	267	1	746	6	580	225	1	812	28	204	8	0	240	85	106	15	1	207	2005
08:00 AM	56	74	58	0	188	4	72	34	0	110	11	58	3	0	72	3	5	0	1	14	384
08:15 AM	34	67	47	1	173	1	67	27	1	96	18	58	2	0	78	6	6	3	0	15	364
Grand Total	411	467	566	2	1486	12	959	326	2	1299	72	391	14	0	477	118	134	29	2	271	3513
Approach %	28.8	33.3	38.8	0.1		0.8	73.8	25.1	0.2		15.1	82.0	2.9	0.0		43.4	49.4	7.4	0.7		
Total %	11.7	13.3	16.1	0.1	41.7	0.3	37.0	9.3	0.1	37.0	2.0	11.1	0.4	0.0	13.6	3.3	3.8	0.8	0.1	7.7	

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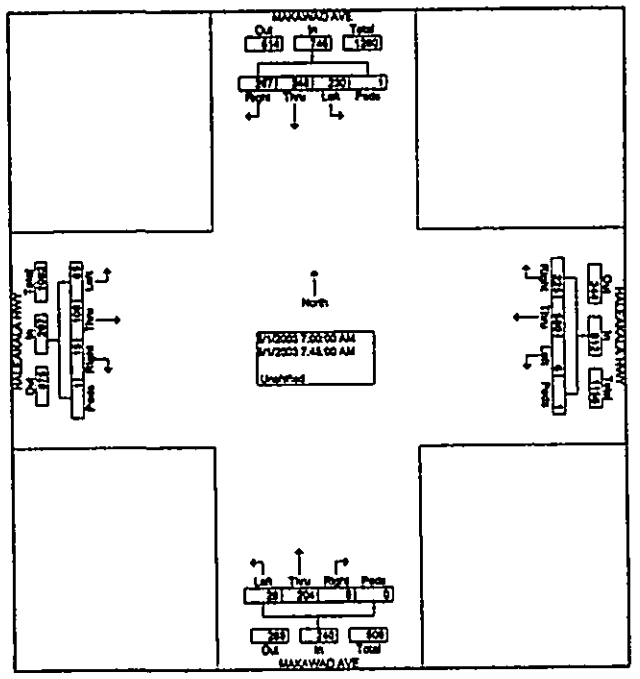
Minor Street: Makawao Ave
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : halmwoe
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	230	248	267	1	746	6	580	225	1	812	28	204	8	0	240	85	106	15	1	207	2005
Percent	30.8	33.2	35.8	0.1		0.7	71.4	27.7	0.1		11.7	85.0	3.3	0.0		41.1	51.2	7.2	0.5		
07:30 Volume	73	58	57	0	189	2	144	65	0	211	7	47	4	0	58	23	46	6	0	75	533
Peak Factor																					0.940
High Int.	07:00 AM					07:15 AM					07:15 AM					07:30 AM					
Volume	62	67	87	1	217	3	172	50	0	225	8	63	1	0	72	23	46	6	0	75	
Peak Factor					0.869					0.902					0.833					0.890	



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Major Street: Haleakala Hwy
Minor Street: Makawao Ave
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmwoc
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	26	79	26	0	122	5	80	36	1	124	6	65	3	0	83	54	48	14	0	116	445
Total	26	79	26	0	122	5	80	36	1	124	6	65	3	0	83	54	48	14	0	116	445
03:00 PM	32	72	31	0	135	2	80	33	0	115	8	61	4	0	73	39	44	9	0	92	413
03:15 PM	32	86	32	0	150	1	80	58	0	139	12	63	3	0	78	41	61	10	0	112	459
03:30 PM	22	88	46	0	156	1	92	51	0	144	15	90	3	0	108	62	64	10	0	134	544
03:45 PM	28	64	40	0	132	3	99	48	0	150	10	101	5	1	117	53	70	10	0	133	532
Total	114	290	151	0	555	7	351	190	0	548	43	315	15	1	374	193	239	39	0	471	1948
04:00 PM	34	61	36	0	133	1	92	51	0	144	9	91	2	0	102	49	79	9	0	136	515
04:15 PM	29	74	29	0	132	3	74	36	0	113	7	80	6	0	103	58	54	12	0	124	472
04:30 PM	26	82	28	0	136	3	79	38	1	122	9	85	1	0	90	72	63	9	1	145	493
Grand Total	229	647	272	0	1048	18	676	354	2	1061	73	661	27	1	782	426	432	83	1	992	3483
Approch %	21.9	62.2	26.0	0.0		1.8	64.3	33.7	0.2		9.8	66.7	3.5	0.1		42.9	46.8	8.4	0.1		
Total %	6.9	14.2	7.1	0.0	27.2	0.5	17.5	9.2	0.1	27.3	1.9	17.2	0.7	0.0	19.8	11.1	12.5	2.2	0.0	25.7	

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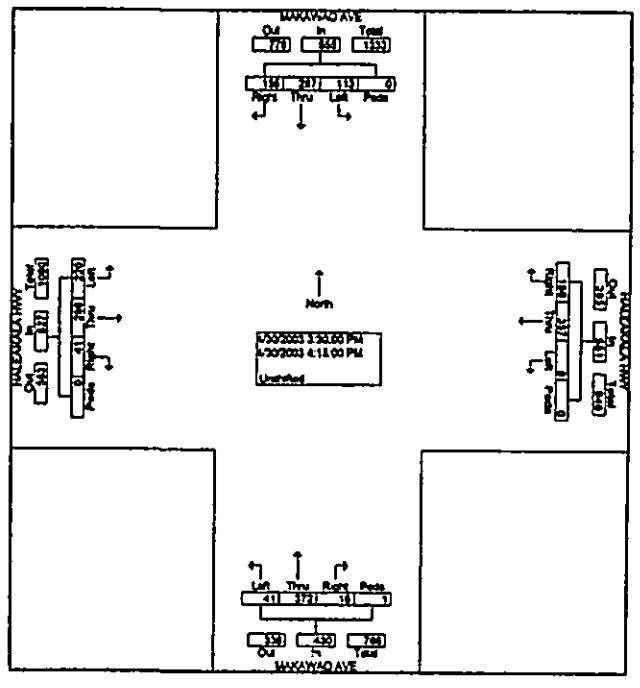
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : halmwoc
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKAWAO AVE Southbound					HALEAKALA HWY Westbound					MAKAWAO AVE Northbound					HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	113	297	158	0	555	9	357	196	0	561	41	372	16	1	430	229	266	41	0	527	2083
Percent	20.4	51.7	27.9	0.0		1.6	64.8	33.8	0.0		9.5	86.5	3.7	0.2		41.7	50.5	7.8	0.0		
03:30	22	88	46	0	156	1	92	51	0	144	15	90	3	0	108	60	64	10	0	134	544
Peak Factor																					0.949
High Int.	03:30 PM					03:45 PM					03:45 PM					04:00 PM					
Volume	22	88	46	0	156	3	99	48	0	150	10	101	5	1	117	49	79	8	0	136	
Peak Factor					0.878					0.919					0.919					0.969	



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Major Street: Kula Hwy
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haikulam
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	4	45	0	0	49	1	7	23	1	34	20	120	3	0	143	1	9	73	0	83	311
06:45 AM	8	49	0	0	57	9	12	30	0	51	29	102	4	0	134	0	14	90	0	104	346
Total	12	94	0	0	106	10	19	53	1	85	49	222	7	0	277	1	23	163	0	186	657
07:00 AM	18	58	0	0	76	9	26	44	0	79	38	136	11	0	186	0	40	96	0	136	467
07:15 AM	8	81	0	0	89	31	20	45	0	96	36	173	24	0	233	0	49	118	0	167	585
07:30 AM	25	99	1	0	125	31	29	40	0	100	69	186	46	0	281	1	29	78	0	107	631
07:45 AM	10	64	0	0	74	30	25	32	0	82	72	169	27	0	268	1	29	78	0	107	531
Total	61	302	1	0	364	101	95	161	0	357	216	644	106	0	966	1	160	420	0	581	2270
08:00 AM	3	54	0	0	57	6	12	17	0	35	41	91	4	0	136	2	8	74	0	85	313
08:15 AM	2	43	1	0	46	14	5	14	0	33	43	84	5	0	132	0	15	57	0	72	290
Grand Total	78	533	2	0	613	131	131	247	1	510	354	1041	124	0	1519	4	206	716	0	926	3540
Approach %	13.4	84.3	0.3	0.0		25.7	25.7	48.4	0.2		23.3	68.5	8.2	0.0		0.4	22.4	77.2	0.0	26.2	
Total %	2.2	14.2	0.1	0.0	16.8	3.7	3.7	7.0	0.0	14.4	10.0	29.4	3.5	0.0	42.9	0.1	5.8	20.2	0.0	26.2	

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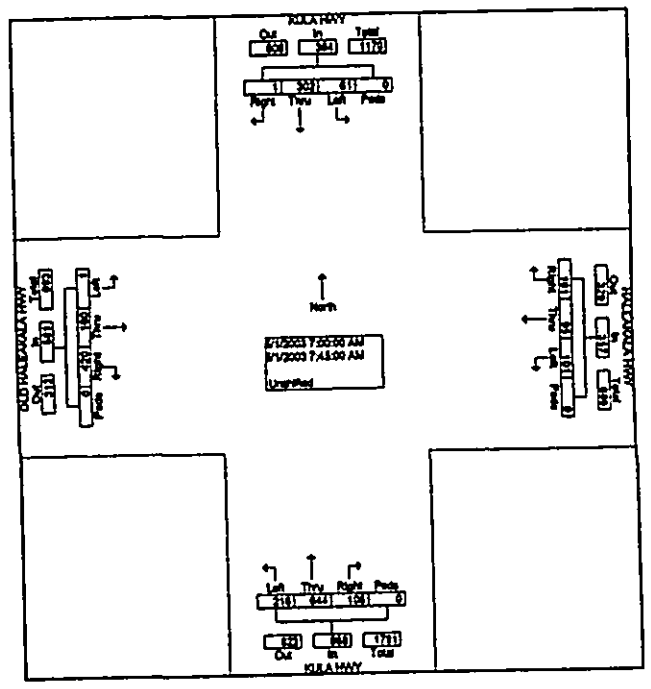
Minor Street: Haleakala Hwy/Old Haleakal
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : haikulam
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
From Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	61	302	1	0	364	101	95	161	0	357	216	644	106	0	966	1	160	420	0	581	2270
Percent	16.8	83.0	0.3	0.0		28.3	26.6	45.1	0.0		22.3	66.7	11.0	0.0		0.2	27.5	72.3	0.0		
07:30	25	99	1	0	125	31	29	40	0	100	69	186	46	0	281	0	43	138	0	181	687
Volume																					0.826
Peak Factor					0.729					0.893					0.941					0.822	
High Int.	07:30 AM					07:30 AM					07:30 AM					07:30 AM					
Volume	25	99	1	0	125	31	29	40	0	100	69	186	46	0	281	0	43	138	0	181	
Peak Factor					0.729					0.893					0.941					0.822	



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Major Street: Kula Hwy
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Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : hakulpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	12	76	1	0	81	11	13	19	0	43	58	106	17	0	183	0	10	68	0	78	385
Total	12	76	1	0	81	11	13	19	0	43	58	106	17	0	183	0	10	68	0	78	385
03:00 PM	13	63	1	0	77	10	27	23	0	60	37	85	13	0	135	1	13	56	0	70	342
03:15 PM	10	60	0	0	80	8	13	30	0	51	58	106	7	0	174	0	19	61	0	80	395
03:30 PM	10	64	1	0	99	17	13	13	0	43	67	147	11	0	225	1	16	44	0	61	428
03:45 PM	12	43	0	0	87	7	11	25	0	43	61	120	7	0	188	0	16	61	0	77	405
Total	45	310	2	0	363	43	63	91	0	197	224	460	38	0	722	2	64	222	0	288	1570
04:00 PM	12	105	0	0	117	11	17	20	0	48	68	116	8	0	179	0	13	49	0	62	406
04:15 PM	15	90	0	0	95	7	11	19	0	37	58	100	9	0	167	0	16	53	0	69	368
04:30 PM	20	61	1	0	82	5	13	27	0	47	43	93	8	0	144	1	11	46	0	58	331
Grand Total	104	640	4	0	748	77	119	173	0	369	437	877	81	0	1395	3	114	435	0	552	3064
Apprch %	13.9	85.6	0.5	0.0		20.9	32.2	46.9	0.0		31.3	62.9	5.8	0.0		0.5	20.7	78.8	0.0		
Total %	3.4	20.9	0.1	0.0	24.4	2.5	3.9	5.6	0.0	12.0	14.3	28.6	2.6	0.0	45.5	0.1	3.7	14.2	0.0	18.0	

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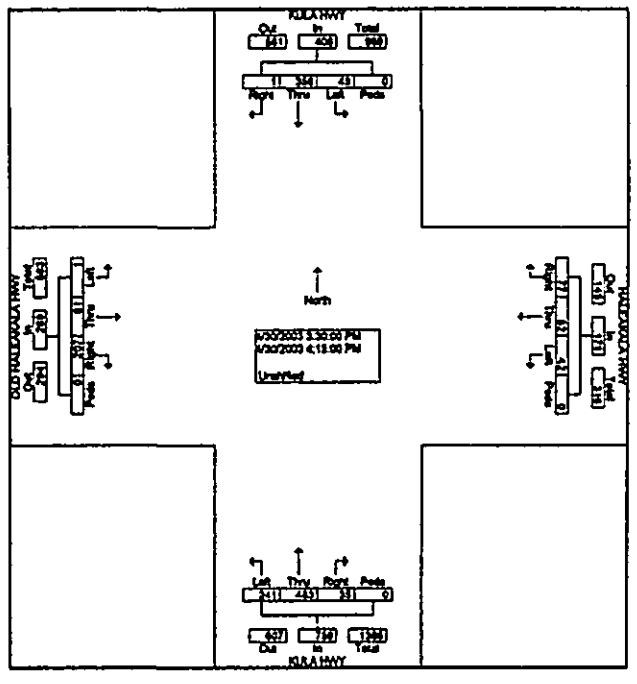
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : hakulpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	KULA HWY Southbound					HALEAKALA HWY Westbound					KULA HWY Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	48	348	1	0	406	42	62	77	0	171	241	483	35	0	759	1	61	207	0	269	1607
Percent	12.0	87.2	0.2	0.0		24.6	30.4	45.0	0.0		31.8	63.8	4.6	0.0		0.4	22.7	77.0	0.0		
03:30	10	64	1	0	99	17	13	13	0	43	67	147	11	0	225	1	16	44	0	61	428
Volume																					
Peak Factor																					0.939
High Int.	04:00 PM					04:00 PM					03:30 PM					03:45 PM					
Volume	12	105	0	0	117	11	17	20	0	48	67	147	11	0	225	0	16	61	0	77	
Peak Factor					0.872					0.891					0.843					0.879	



Austin Tsutsumi & Associates, Inc.
501 Sumner Street, Suite 521
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Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldpukam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	0	0	0	0	0	22	47	0	1	70	117	0	28	0	145	0	71	18	0	89	304
06:45 AM	0	0	0	0	0	40	37	0	0	77	151	0	29	0	180	0	67	29	0	96	353
Total	0	0	0	0	0	62	84	0	1	147	268	0	57	0	325	0	138	47	0	185	657
07:00 AM	0	0	0	0	0	45	56	0	0	101	169	0	36	0	205	0	83	49	0	112	418
07:15 AM	0	0	0	0	0	63	51	0	0	114	134	0	51	0	185	0	74	56	1	131	430
07:30 AM	0	0	0	0	0	74	36	0	1	111	134	0	62	0	196	0	86	57	1	144	451
07:45 AM	0	0	0	0	0	91	40	0	0	131	114	0	46	5	165	0	60	49	0	109	406
Total	0	0	0	0	0	273	183	0	1	457	551	0	195	5	751	0	283	211	2	496	1704
08:00 AM	0	0	0	0	0	55	51	0	2	108	73	0	33	0	106	0	53	31	0	114	328
08:15 AM	0	0	0	0	0	66	31	0	0	96	66	0	34	0	122	0	49	64	0	113	331
Grand Total	0	0	0	0	0	456	349	0	4	808	960	0	319	5	1304	0	453	343	2	796	3013
Apprch %	0.0	0.0	0.0	0.0		56.3	43.2	0.0	0.5		73.2	0.0	24.5	0.4		0.0	61.8	34.2	0.2		
Total %	0.0	0.0	0.0	0.0	0.0	15.1	11.6	0.0	0.1	26.8	32.6	0.0	10.6	0.2	43.3	0.0	15.0	11.4	0.1	26.5	

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Major Street: Old Haleakala Hwy
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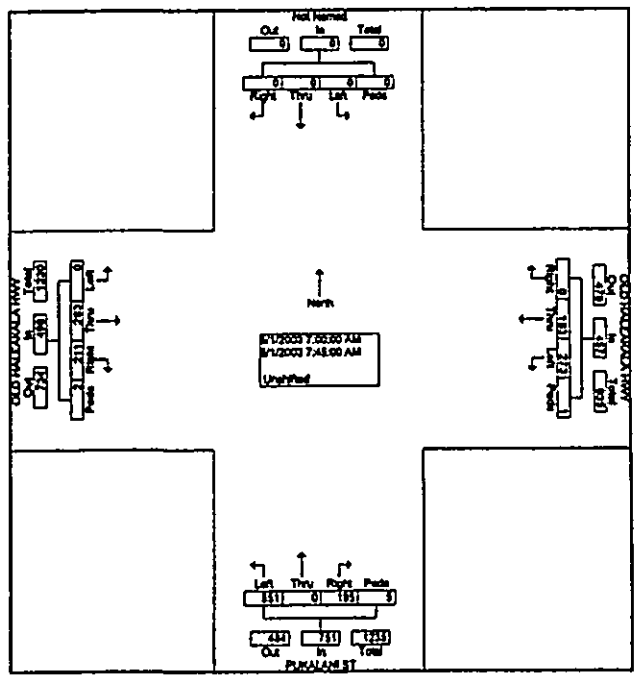
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldpukam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	0	0	0	0	273	183	0	1	457	551	0	195	5	751	0	283	211	2	496	1704
Percent	0.0	0.0	0.0	0.0		59.7	40.0	0.0	0.2		73.4	0.0	26.0	0.7		0.0	57.1	42.5	0.4		
07:30	0	0	0	0	0	74	36	0	1	111	134	0	62	0	196	0	86	57	1	144	451
Volume																					0.945
Peak Factor																					
High Int.	6:15:00 AM					07:45 AM										07:30 AM					
Volume	0	0	0	0	0	91	40	0	0	131	169	0	36	0	205	0	86	57	1	144	
Peak Factor										0.872					0.916					0.961	



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Major Street: Old Haleakala Hwy
Minor Street: Pukalani St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldpukpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 1

Groups Printed- Unshifted

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	0	0	0	0	0	80	29	0	0	109	56	0	72	0	128	0	30	81	0	111	348
Total	0	0	0	0	0	80	29	0	0	109	56	0	72	0	128	0	30	81	0	111	348
03:00 PM	0	0	0	0	0	77	18	0	0	95	53	0	66	0	121	0	31	82	0	113	329
03:15 PM	0	0	0	0	0	88	24	0	0	112	68	0	76	0	144	0	38	73	0	111	367
03:30 PM	0	0	0	0	0	96	27	0	0	123	66	0	85	0	151	0	45	106	1	154	427
03:45 PM	0	0	0	0	0	98	20	0	0	118	73	0	86	0	159	0	39	116	0	155	429
Total	0	0	0	0	0	355	89	0	0	444	262	0	282	0	544	0	153	379	1	533	1551
04:00 PM	0	0	0	0	0	67	44	0	0	111	75	0	84	0	159	0	33	114	0	147	417
04:15 PM	0	0	0	0	0	88	28	0	0	94	84	0	88	3	125	0	43	107	0	150	369
04:30 PM	0	0	0	0	0	79	28	0	0	98	78	0	75	1	153	0	32	120	0	152	403
04:45 PM	0	0	0	0	0	841	213	0	0	856	623	0	692	4	1118	0	291	801	1	1093	3068
Grand Total	0	0	0	0	0	74.8	25.1	0.0	0.0		44.7	0.0	52.8	0.4		0.0	26.6	73.3	0.1		
Approach %	0.0	0.0	0.0	0.0		22.9	7.0	0.0	0.0	27.9	17.0	0.0	19.3	0.1	36.5	0.0	8.8	26.1	0.0	35.6	
Total %	0.0	0.0	0.0	0.0	0.0																

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Major Street: Old Haleakala Hwy
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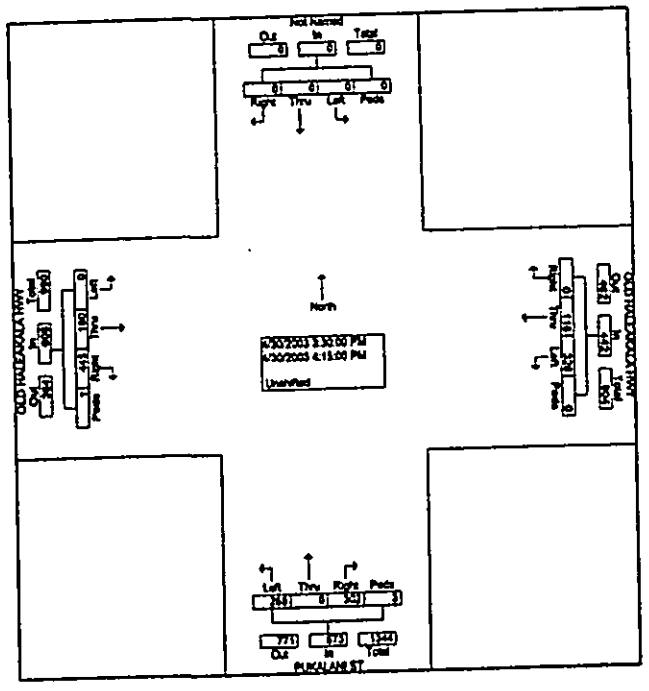
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldpukpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 2

	Southbound					OLD HALEAKALA HWY Westbound					PUKALANI ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM				0	328	116	0	0	442	255	0	302	3	573	0	180	445	1	606	1621
Volume	0	0	0	0		73.8	26.2	0.0	0.0		44.8	0.0	52.7	0.5		0.0	29.4	73.4	0.2		
Percent	0.0	0.0	0.0	0.0																	
03:45 Volume	0	0	0	0	0	98	25	0	0	115	73	0	85	0	158	0	39	116	0	155	428
Peak Factor																					0.947
High Int.	2:30:00 PM					03:30 PM					04:00 PM					03:45 PM					
Volume	0	0	0	0	0	95	27	0	0	122	75	0	84	0	159	0	39	116	0	155	
Peak Factor										0.906					0.901					0.977	



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Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldmwoa
Site Code : 0000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	12	2	25	0	39	5	17	0	0	22	10	13	4	0	27	23	70	4	0	102	190
06:45 AM	11	6	33	0	50	7	30	5	0	47	7	5	5	0	24	39	65	2	1	113	229
Total	23	8	58	0	89	10	47	13	0	70	17	23	13	0	53	64	135	6	1	215	427
07:00 AM	15	4	54	0	83	12	42	18	0	72	9	14	32	1	56	25	82	3	0	120	331
07:15 AM	10	7	41	0	58	7	46	10	0	63	6	27	53	0	86	47	102	3	0	152	358
07:30 AM	16	13	46	0	75	15	59	6	0	80	5	21	42	0	68	34	124	5	0	167	390
07:45 AM	8	12	87	0	77	15	71	25	0	111	8	12	23	1	44	53	79	6	2	142	374
Total	49	36	228	0	293	49	218	59	0	326	28	74	150	2	254	163	387	19	2	581	1454
08:00 AM	11	8	54	0	73	4	43	11	0	58	7	17	12	0	36	47	62	6	3	118	287
08:15 AM	9	7	57	0	82	6	38	14	0	58	3	12	10	0	25	56	47	9	0	112	284
Grand Total	81	56	349	0	536	59	346	97	0	512	55	126	185	2	368	334	596	37	6	1033	3432
Apprch %	15.1	10.4	72.3	0.0		13.5	67.6	18.9	0.0		14.9	34.2	50.3	0.5		32.3	63.5	3.6	0.6		
Total %	3.7	2.4	15.9	0.0	22.0	2.9	14.1	4.0	0.0	20.9	2.2	5.1	7.5	0.1	15.0	13.8	26.8	1.5	0.2	42.1	

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Major Street: Old Haleakala Hwy
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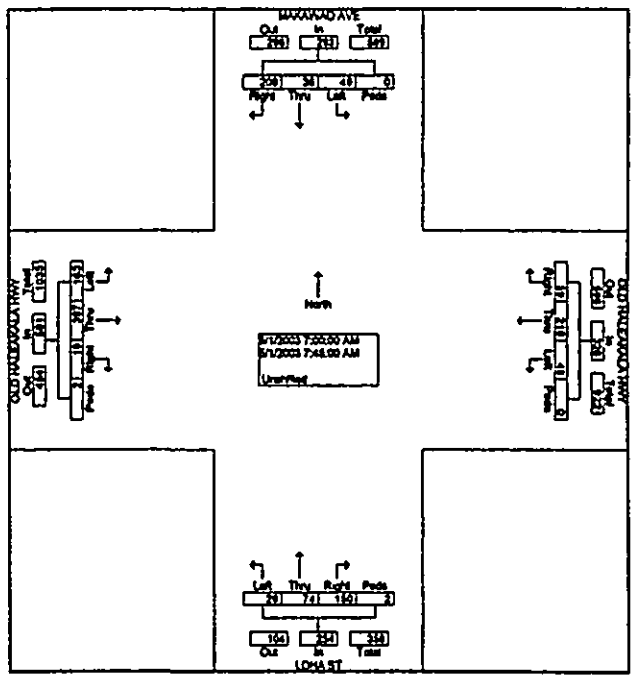
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : oldmwoa
Site Code : 0000000
Start Date : 05/01/20
Page No : 2

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	49	36	206	0	293	49	218	59	0	326	28	74	150	2	254	163	387	19	2	581	1454
Percent	16.7	12.3	71.0	0.0		15.0	66.9	18.1	0.0		11.0	29.1	59.1	0.8		28.1	66.3	3.3	0.3		
07:30	16	13	46	0	75	15	59	6	0	80	5	21	42	0	68	34	124	5	0	167	390
Volume																					
Peak Factor																					0.932
High Int.	07:00 AM					07:45 AM										07:15 AM					
Volume	15	4	54	0	83	15	71	25	0	111	8	27	53	0	86	07:30 AM					
Peak Factor					0.883				0.734						0.736	34	124	5	0	167	
																				0.873	



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Major Street: Old Haleakala Hwy
Minor Street: Makawao Ave/Loha St
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldmwoc
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	6	12	56	0	74	14	58	12	0	84	2	12	9	0	23	73	56	3	2	134	315
Total	6	12	56	0	74	14	58	12	0	84	2	12	9	0	23	73	56	3	2	134	315
03:00 PM	13	9	63	0	85	4	52	9	0	65	4	9	9	0	22	57	47	6	2	112	284
03:15 PM	26	13	55	0	94	11	42	12	0	65	7	13	13	0	29	78	46	1	0	125	313
03:30 PM	11	14	75	0	100	19	59	21	0	99	2	18	7	0	27	74	45	2	0	118	338
03:45 PM	17	12	65	0	94	7	51	13	0	71	4	17	6	1	28	79	64	6	0	129	322
Total	67	48	258	0	373	33	204	55	0	291	17	57	35	1	106	288	191	15	2	494	1263
04:00 PM	8	8	61	0	78	8	48	13	0	69	5	16	6	0	27	74	51	5	0	130	298
04:15 PM	9	19	63	0	91	13	45	13	1	72	6	8	8	0	22	73	55	15	0	143	328
04:30 PM	13	14	49	0	76	8	53	5	0	66	3	11	5	0	19	65	45	4	1	115	276
Grand Total	103	102	489	0	694	72	408	96	1	578	28	104	63	1	196	588	396	43	3	1011	2440
Approch %	14.8	14.7	70.5	0.0		12.4	70.5	16.6	0.2		14.3	53.1	32.1	0.5		58.2	39.4	4.2	0.6		
Total %	4.2	4.1	19.7	0.0	28.0	2.9	16.5	4.0	0.0	23.3	1.1	4.3	2.5	0.0	7.8	22.8	15.9	1.7	0.2	40.8	

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Major Street: Old Haleakala Hwy
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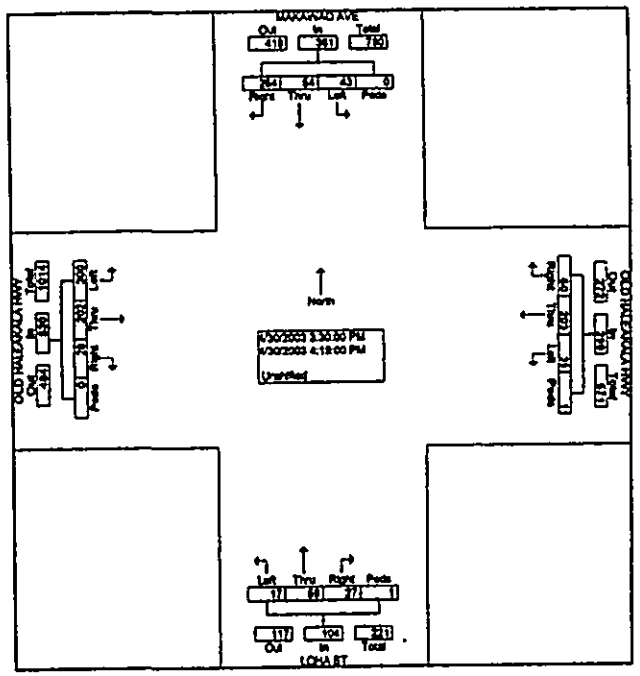
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : oldmwoc
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	MAKAWAO AVE Southbound					OLD HALEAKALA HWY Westbound					LOHA ST Northbound					OLD HALEAKALA HWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:45 PM to 04:30 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	43	54	454	0	341	33	223	80	1	299	17	58	27	1	104	303	202	25	0	530	1294
Percent	11.8	15.0	73.1	0.0		11.7	67.9	23.1	0.3		16.3	56.7	25.0	1.0		64.8	38.1	5.3	0.0		
03:30	11	14	75	0	100	19	59	21	0	99	2	18	7	0	27	74	42	2	0	118	335
Volume																					0.964
Peak Factor																					
High Int.	03:30 PM					03:30 PM					03:45 PM					04:15 PM					
Volume	11	14	75	0	100	19	59	21	0	99	4	17	6	1	28	73	55	15	0	143	
Peak Factor					0.903					0.831					0.929					0.927	



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Major Street: Kula Hwy
Minor Street: King Kekaulike/Residential
Time of Count: 8:30 AM-8:30 AM
Weather: Clear

File Name : kuldnem
Site Code : 00000000
Start Date : 05/01/20
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					KING KEKAULIKE SCHOOL Westbound					KULA HWY Northbound					RESIDENTIAL DRWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peds	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
08:30 AM	12	108	0	0	120	1	0	4	0	5	0	133	3	0	136	0	0	0	0	0	261
08:45 AM	18	126	1	0	145	2	0	6	0	8	0	126	0	0	141	1	0	0	0	1	295
Total	30	234	1	0	265	3	0	10	0	13	0	259	3	0	276	1	0	0	0	1	556
07:00 AM	28	116	0	0	143	1	0	10	0	20	0	177	26	0	203	0	0	1	0	1	366
07:15 AM	40	179	0	0	223	0	0	22	0	28	0	228	23	0	249	0	0	0	0	0	500
07:30 AM	104	161	0	1	266	7	0	36	0	43	0	212	48	1	261	2	0	1	0	3	572
07:45 AM	49	118	1	2	157	4	0	48	0	53	0	221	29	0	250	0	1	0	0	1	471
Total	221	574	1	3	809	12	0	125	0	143	0	838	111	1	962	2	1	2	0	5	1919
08:00 AM	16	130	0	0	136	3	0	7	0	10	0	123	3	0	126	0	0	0	0	0	272
08:15 AM	8	96	0	0	104	1	1	7	0	9	1	121	3	0	125	0	0	0	0	0	238
Grand Total	295	1034	2	3	1111	26	1	149	0	176	1	1342	146	1	1488	3	1	2	0	6	3361
Approach %	21.6	77.8	0.2	0.2		14.8	0.6	84.1	0.0		0.1	90.1	9.7	0.1		66.8	16.7	33.3	0.0		
Total %	8.8	34.3	0.1	0.1	44.9	0.8	0.0	4.9	0.0	5.9	0.0	44.9	4.9	0.0	49.8	0.1	0.0	0.1	0.0	0.2	

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Major Street: Kula Hwy
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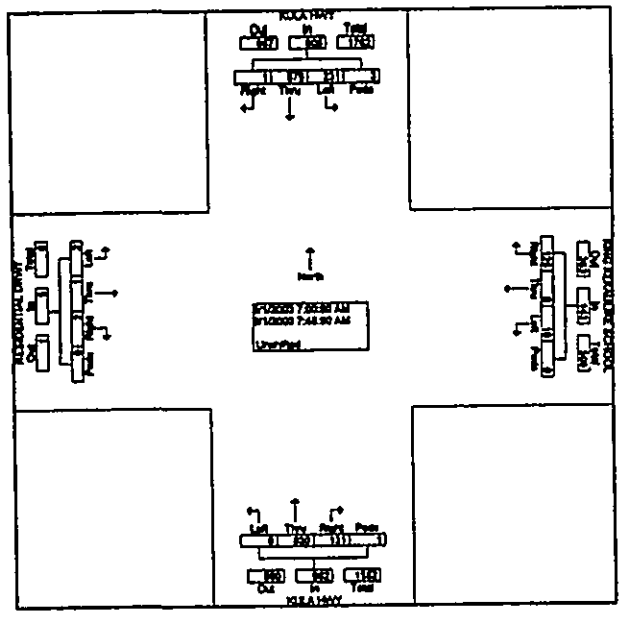
Time of Count: 8:30 AM-8:30 AM
Weather: Clear

File Name : kuldnem
Site Code : 00000000
Start Date : 05/01/20
Page No : 2

	KULA HWY Southbound					KING KEKAULIKE SCHOOL Westbound					KULA HWY Northbound					RESIDENTIAL DRWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 08:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:30 AM																				
Volume	221	579	1	3	805	10	0	125	0	143	0	838	131	1	962	2	1	2	0	5	1910
Percent	55.7	70.8	0.1	0.4		12.8	0.0	87.4	0.0		0.0	84.3	13.6	0.1		40.0	20.0	40.0	0.0		
07:30	104	161	0	1	266	7	0	36	0	42	0	212	48	1	261	2	0	1	0	3	572
Volume																					0.837
Peak Factor																					
High Int.	07:30 AM					07:45 AM										07:30 AM					
Volume	104	161	0	1	266	4	0	48	0	53	0	212	48	1	261	2	0	1	0	3	
Peak Factor					0.797					0.675					0.921					0.417	



Austin Tsutsumi & Associates, Inc.
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Major Street: Kula Hwy
Minor Street: King Kekaulike/Residential
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulkingpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					KING KEKAULIKE SCHOOL Westbound					KULA HWY Northbound					RESIDENTIAL DRWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	0	145	1	0	146	0	0	4	0	4	1	169	1	0	171	2	0	0	0	2	323
Total	0	145	1	0	146	0	0	4	0	4	1	169	1	0	171	2	0	0	0	2	323
03:00 PM	4	122	0	0	126	0	0	0	0	0	0	122	3	0	125	1	0	0	0	1	252
03:15 PM	6	145	0	0	150	2	0	14	0	16	0	154	3	0	157	0	0	0	0	0	323
03:30 PM	6	133	0	0	139	2	0	13	0	15	0	211	0	0	211	0	0	0	0	0	365
03:45 PM	6	148	1	0	155	1	0	9	0	10	3	170	1	0	174	0	0	1	0	1	340
Total	21	548	1	0	570	11	0	44	0	55	3	661	7	0	671	1	0	1	0	2	1298
04:00 PM	8	164	0	0	172	1	0	5	0	6	0	177	2	0	179	2	0	0	0	2	366
04:15 PM	3	148	0	0	151	3	0	3	0	6	0	157	0	0	157	0	0	0	0	0	314
04:30 PM	2	82	0	0	84	3	0	3	0	6	1	119	0	0	120	1	0	0	0	1	211
Grand Total	37	1086	2	0	1125	18	0	55	0	73	4	1296	16	0	1316	5	0	1	0	7	2539
Approach %	3.3	96.5	0.2	0.0	44.3	24.7	0.0	75.3	0.0	2.9	0.3	98.5	1.2	0.0	51.8	66.7	0.0	14.3	0.0	0.3	
Total %	1.5	42.8	0.1	0.0	44.3	0.7	0.0	2.2	0.0	2.9	0.2	51.0	0.6	0.0	51.8	0.2	0.0	0.0	0.0	0.3	

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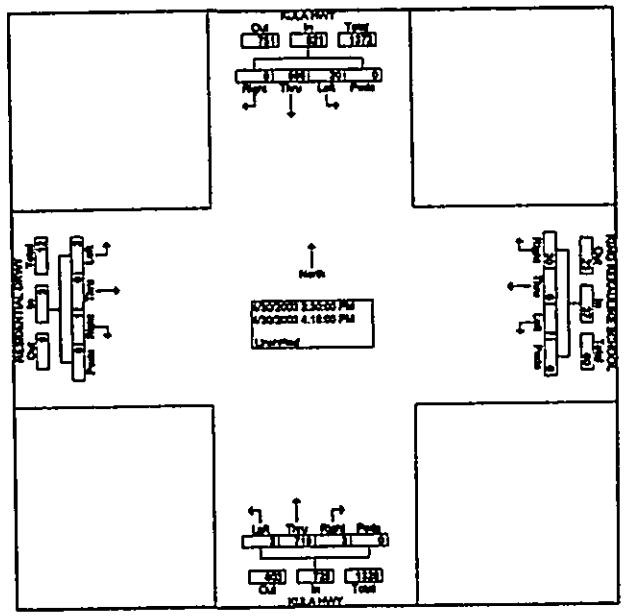
Major Street: Kula Hwy
Minor Street: King Kekaulike/Residential
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulkingpm
Site Code : 0000000
Start Date : 04/30/20
Page No : 2

	KULA HWY Southbound					KING KEKAULIKE SCHOOL Westbound					KULA HWY Northbound					RESIDENTIAL DRWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	20	566	4	0	621	7	0	30	0	37	3	719	3	0	725	2	0	1	0	3	1386
Percent	3.2	96.3	1.8	0.0		18.9	0.0	81.1	0.0		0.4	99.2	0.4	0.0		66.7	0.0	33.3	0.0		
03:30 Volume	6	133	0	0	139	2	0	13	0	15	0	211	0	0	211	0	0	0	0	0	365
Peak Factor																					.949
High Int.	04:00 PM					03:30 PM					03:30 PM					04:00 PM					
Volume	8	166	0	0	173	2	0	13	0	15	0	211	0	0	211	2	0	0	0	2	
Peak Factor					0.897					0.917					0.844					0.375	



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Major Street: Kula Hwy
Minor Street: Aapueo Pkwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulaapam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					Westbound					KULA HWY Northbound					AAPUEO PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	0	72	44	0	116	0	0	0	0	0	2	137	0	0	139	2	0	0	0	2	257
06:45 AM	0	73	56	0	129	0	0	0	0	0	0	134	0	0	140	5	0	0	0	5	273
Total	0	145	99	0	244	0	0	0	0	0	2	271	0	0	279	7	0	0	0	7	530
07:00 AM	0	62	87	0	149	0	0	0	0	0	9	164	0	0	173	36	0	3	0	39	331
07:15 AM	0	83	85	0	168	0	0	0	0	0	22	206	0	0	227	36	0	10	0	46	455
07:30 AM	0	120	57	0	177	0	0	0	0	0	21	234	0	0	255	54	0	17	0	71	503
07:45 AM	0	107	13	0	122	0	0	0	0	0	6	197	0	0	203	28	0	7	0	41	366
Total	0	343	219	0	651	0	0	0	0	0	58	800	0	0	858	154	0	33	0	199	1658
08:00 AM	0	112	9	0	121	0	0	0	0	0	3	108	0	0	111	16	0	3	0	12	343
08:15 AM	0	97	6	0	103	0	0	0	0	0	3	121	0	0	124	4	0	3	0	7	234
Grand Total	0	736	333	0	1069	0	0	0	0	0	71	1305	0	0	1371	185	0	46	0	225	3665
Approach %	0.0	68.8	31.2	0.0		0.0	0.0	0.0	0.0		5.2	94.8	0.0	0.0		82.2	0.0	17.8	0.0		
Total %	0.0	27.8	12.8	0.0	40.1	0.0	0.0	0.0	0.0	0.0	2.7	44.8	0.0	0.0	51.4	6.9	0.0	1.8	0.0	8.4	

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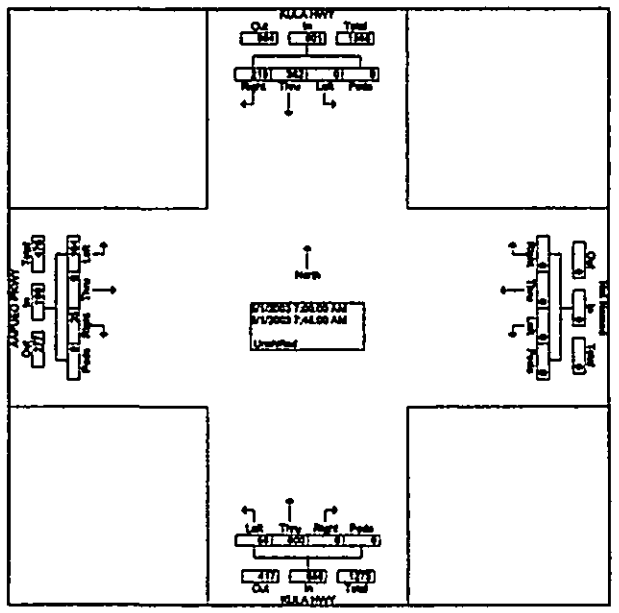
Major Street: Kula Hwy
Minor Street: Aapueo Pkwy
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulaapam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	KULA HWY Southbound					Westbound					KULA HWY Northbound					AAPUEO PKWY Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 06:30 AM to 08:15 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	0	362	219	0	581	0	0	0	0	0	58	800	0	0	858	154	0	33	0	199	1658
Percent	0.0	62.3	37.7	0.0		0.0	0.0	0.0	0.0		6.8	93.2	0.0	0.0		77.4	0.0	16.6	0.0		
07:30	0	120	57	0	177	0	0	0	0	0	21	234	0	0	255	54	0	17	0	71	503
Volume																					
Peak Factor																					0.824
High Int.	07:15 AM					0:15:00 AM					07:30 AM					07:30 AM					
Volume	0	83	90	0	163	0	0	0	0	0	21	234	0	0	255	54	0	17	0	71	
Peak Factor					0.821										0.841					0.791	



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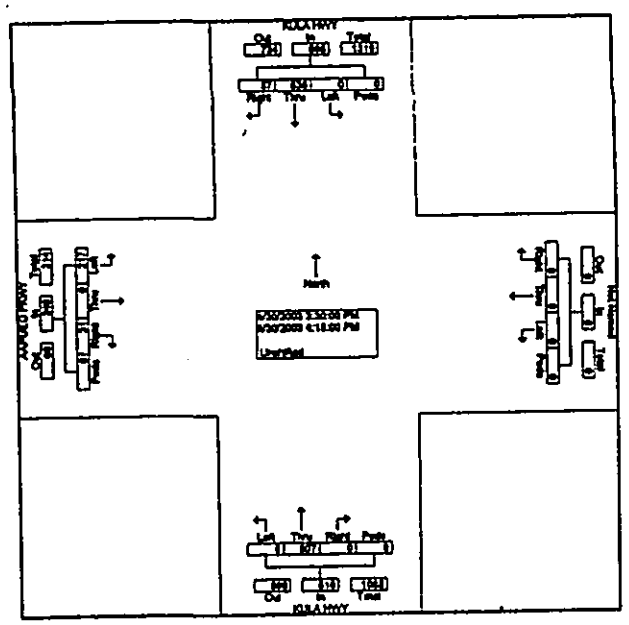
Major Street: Kula Hwy
Minor Street: Aapueo Pkwy
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulaappr
Site Code : 0000000
Start Date : 04/30/20
Page No : 1

Groups Printed- Unshifted

Start Time	KULA HWY Southbound					KULA HWY Westbound					KULA HWY Northbound					AAPUEO PKWY Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	02:30 PM																				
Volume	0	530	57	0	586	0	0	0	0	0	0	807	0	0	810	217	0	31	0	248	1339
Percent	0.0	90.4	9.6	0.0		0.0	0.0	0.0	0.0		1.7	98.3	0.0	0.0		87.5	0.0	12.5	0.0		
02:30	0	123	14	0	137	0	0	0	0	0	4	124	0	0	128	84	0	18	0	106	371
Volume																					0.818
Peak Factor																					
High Int.	04:00 PM										02:45 PM					03:30 PM					
Volume	0	141	22	0	163	0	0	0	0	0	4	139	0	0	143	86	0	18	0	106	
Peak Factor					0.813										0.903					0.943	



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Major Street: Kula Hwy
Minor Street: Omaopio Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulomaam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					OMAOPIO RD Westbound					KULA HWY Northbound					OMAOPIO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
06:30 AM	7	84	4	0	75	0	1	46	0	47	1	87	0	0	88	0	1	3	0	13	223
06:45 AM	9	54	4	0	67	1	7	43	0	51	1	87	1	0	89	4	1	4	0	9	208
Total	16	138	8	0	152	1	8	89	0	98	2	174	1	0	177	13	2	7	0	22	429
07:00 AM	6	81	4	0	90	2	9	63	0	74	3	192	2	0	197	8	2	3	0	10	251
07:15 AM	9	78	6	0	91	0	6	53	0	59	2	190	0	0	192	11	1	3	0	15	317
07:30 AM	15	96	9	0	130	0	6	46	0	51	4	148	0	0	152	11	2	6	0	19	342
07:45 AM	13	90	13	0	107	0	2	34	0	36	11	93	1	0	106	4	2	3	0	9	258
Total	43	303	33	0	378	2	23	196	0	223	20	623	3	0	646	31	7	15	0	53	1170
08:00 AM	13	74	7	0	94	0	3	29	0	31	2	99	2	0	84	4	0	1	0	5	214
08:15 AM	9	91	7	0	107	0	1	31	0	32	1	83	1	0	85	2	4	3	0	9	233
Grand Total	81	576	54	0	711	3	36	345	0	384	23	930	7	0	962	50	13	26	0	89	2046
Approch %	11.4	81.0	7.6	0.0		0.8	9.4	89.8	0.0		2.4	96.7	0.8	0.0		56.2	14.6	29.2	0.0		
Total %	4.0	28.2	2.6	0.0	34.8	0.1	1.8	16.9	0.0	18.8	1.2	45.6	0.3	0.0	47.1	2.4	0.6	1.3	0.0	4.3	

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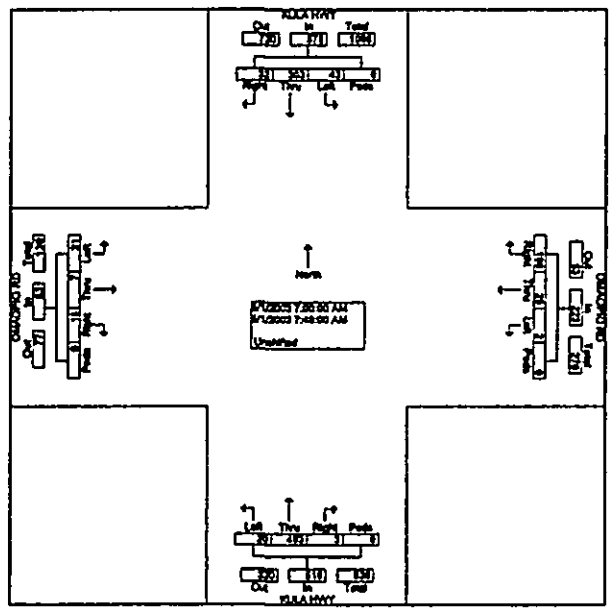
Major Street: Kula Hwy
Minor Street: Omaopio Rd
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulomaam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	KULA HWY Southbound					OMAOPIO RD Westbound					KULA HWY Northbound					OMAOPIO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection	07:00 AM																				
Volume	43	303	33	0	378	2	23	196	0	223	20	623	3	0	646	31	7	15	0	53	1170
Percent	11.4	80.2	8.8	0.0		0.9	10.3	87.9	0.0		3.1	96.4	0.5	0.0		58.5	13.2	28.3	0.0		
07:30 Volume	15	96	9	0	130	0	6	46	0	51	4	148	0	0	152	11	2	6	0	19	342
Peak Factor																					0.855
High Int.	07:30 AM										07:00 AM					07:15 AM				07:30 AM	
Volume	15	96	9	0	130						2	0	53	0	74	2	150	0	0	152	11	2	6	0	19	
Peak Factor					0.798										0.733					0.848					0.897	



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Major Street: Kula Hwy
Minor Street: Omaopio Rd
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulomapm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					OMAOPIO RD Westbound					KULA HWY Northbound					OMAOPIO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
02:45 PM	29	88	9	0	127	0	4	17	0	21	1	101	1	0	103	3	2	6	0	11	342
Total	29	88	9	0	127	0	4	17	0	21	1	101	1	0	103	3	2	6	0	11	342
03:00 PM	29	64	7	0	100	0	0	15	0	15	3	75	1	0	79	3	3	3	0	9	303
03:15 PM	17	83	11	0	111	1	1	15	0	17	5	79	3	0	87	0	0	4	0	13	328
03:30 PM	23	96	10	0	129	1	3	20	0	24	7	87	1	0	100	0	0	4	0	13	271
03:45 PM	24	93	11	0	116	2	2	19	0	23	2	95	0	0	97	12	3	1	0	16	243
Total	93	336	39	0	456	4	6	69	0	79	16	341	5	0	362	27	12	12	0	51	1145
04:00 PM	31	91	6	0	128	0	5	21	0	26	5	96	1	0	101	4	3	2	0	9	264
04:15 PM	31	91	7	0	129	1	1	19	0	21	2	86	0	0	88	6	6	3	0	15	253
04:30 PM	34	86	6	0	96	0	2	21	0	23	2	84	2	0	88	12	3	2	0	17	224
Grand Total	298	846	96	0	940	5	15	147	0	170	36	797	9	0	742	51	25	23	0	101	1333
Apprch %	22.8	70.2	7.2	0.0	47.6	2.9	10.6	86.5	0.0		3.8	85.3	1.2	0.0	36.4	50.5	24.8	24.8	0.0	8.2	
Total %	10.9	33.4	3.4	0.0	47.6	0.3	0.9	7.8	0.0	9.0	1.3	34.8	0.3	0.0	36.4	2.9	1.3	1.3	0.0	5.2	

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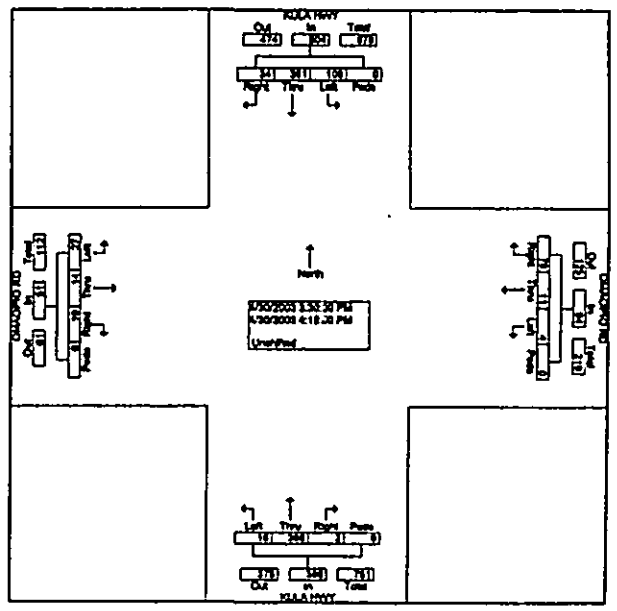
Major Street: Kula Hwy
Minor Street: Omaopio Rd
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulomapm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 2

	KULA HWY Southbound					OMAOPIO RD Westbound					KULA HWY Northbound					OMAOPIO RD Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 02:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	02:30 PM																				
Volume	100	361	34	0	634	4	11	73	0	94	16	366	2	0	386	37	14	10	0	51	1033
Percent	31.6	71.0	6.7	0.0		4.3	11.7	84.0	0.0		4.1	94.3	0.5	0.0		82.9	27.5	19.6	0.0		
02:30	23	96	10	0	129	1	3	20	0	24	7	97	1	0	106	6	3	4	0	13	271
Volume																					
Peak Factor																					0.948
High Int.	03:30 PM					04:00 PM					03:30 PM					03:45 PM					
Volume	23	96	10	0	129	0	5	21	0	26	7	97	1	0	105	12	3	1	0	16	
Peak Factor				0.977					0.904					0.919					0.797		



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Major Street: Kula Hwy
Minor Street: Kekaulike Ave
Time of Count: 8:30 AM-8:30 AM
Weather: Clear

File Name : kulkekam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					KEKAULIKE AVE Westbound					KULA HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
08:30 AM	0	18	0	0	18	3	0	10	0	13	0	36	0	0	36	0	0	0	0	0	67
08:45 AM	10	43	0	0	53	7	0	14	0	21	0	35	10	0	45	0	0	0	0	0	119
Total	10	61	0	0	71	10	0	24	0	34	0	61	10	0	71	0	0	0	0	0	186
07:00 AM	7	24	0	0	31	3	0	10	0	13	0	35	1	0	40	0	0	0	0	0	84
07:15 AM	8	22	0	0	30	0	0	20	0	20	0	57	1	0	58	0	0	0	0	0	108
07:30 AM	10	37	0	0	47	3	0	10	0	31	0	30	0	0	32	0	0	0	0	0	130
07:45 AM	15	33	0	0	47	3	0	12	0	26	0	32	2	0	34	0	0	0	0	0	101
Total	40	116	0	0	154	22	0	76	0	82	0	190	14	0	204	0	0	0	0	0	451
08:00 AM	9	32	0	0	40	8	0	13	0	21	0	28	2	0	27	0	0	0	0	0	88
08:15 AM	12	37	0	0	50	5	0	15	0	34	0	33	3	0	36	0	0	0	0	0	116
Grand Total	71	246	0	0	317	46	0	128	0	171	0	309	29	0	338	0	0	0	0	0	826
Approch %	22.4	77.6	0.0	0.0		26.3	0.0	73.7	0.0		0.0	91.4	8.6	0.0		0.0	0.0	0.0	0.0	0.0	
Total %	8.6	29.8	0.0	0.0	38.4	5.6	0.0	15.5	0.0	20.7	0.0	37.4	3.5	0.0	40.9	0.0	0.0	0.0	0.0	0.0	

Austin Tsutsumi & Associates, Inc.
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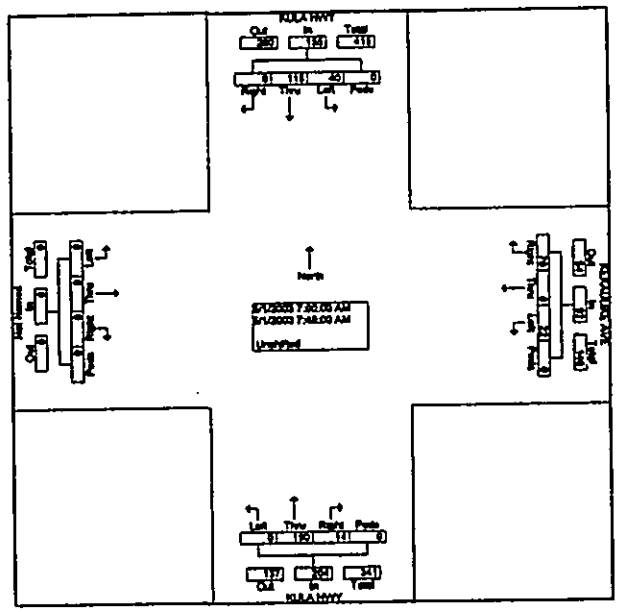
Major Street: Kula Hwy
Minor Street: Kekaulike Ave
Time of Count: 8:30 AM-8:30 AM
Weather: Clear

File Name : kulkekam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	KULA HWY Southbound					KEKAULIKE AVE Westbound					KULA HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection	07:00 AM				154					82					204						451
Volume	40	116	0	0		22	0	76	0		0	190	14	0		0	0	0	0	0	
Percent	25.9	74.2	0.0	0.0		23.9	0.0	76.1	0.0		0.0	93.1	6.9	0.0		0.0	0.0	0.0	0.0	0.0	
07:15	8	22	0	0	30	0	0	20	0	20	0	57	1	0	58	0	0	0	0	0	136
Volume																					0.829
Peak Factor																					
High Int.	07:30 AM					07:15 AM					07:15 AM										
Volume	10	37	0	0	47	3	0	30	0	33	0	57	1	0	58						
Peak Factor					0.824					0.606					0.759						



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Ph: (808)533-3646 Fax: (808)526-1267

Major Street: Kula Hwy
Minor Street: Kekaulike Ave
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulkekpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					KEKAULIKE AVE Westbound					KULA HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
02:45 PM	7	36	0	0	43	6	0	6	0	12	0	36	4	0	40	0	0	0	0	0	95
Total	7	36	0	0	43	6	0	6	0	12	0	36	4	0	40	0	0	0	0	0	95
03:00 PM	6	4	0	0	8	1	0	4	0	5	0	26	2	0	28	0	0	0	0	0	41
03:15 PM	6	36	0	0	32	3	0	9	0	12	0	32	0	0	32	0	0	0	0	0	76
03:30 PM	6	29	0	0	35	7	0	8	0	15	0	30	3	0	33	0	0	0	0	0	83
03:45 PM	0	28	0	0	37	0	0	7	0	7	0	36	3	0	39	0	0	0	0	0	83
Total	22	91	0	0	122	11	0	28	0	39	0	124	8	0	132	0	0	0	0	0	293
04:00 PM	17	40	0	0	57	6	0	15	0	21	0	73	6	0	79	0	0	0	0	0	157
04:15 PM	15	31	0	0	46	4	0	4	0	8	0	47	0	0	47	0	0	0	0	0	101
04:30 PM	13	42	0	0	55	3	0	15	0	18	0	52	3	0	55	0	0	0	0	0	128
Grand Total	91	240	0	0	334	32	0	66	0	97	0	344	25	0	372	0	0	0	0	0	779
Approch %	26.9	74.1	0.0	0.0		33.0	0.0	67.0	0.0		0.0	92.5	7.5	0.0		0.0	0.0	0.0	0.0		
Total %	10.5	30.3	0.0	0.0	46.9	4.0	0.0	8.2	0.0	12.2	0.0	43.4	3.2	0.0	46.9	0.0	0.0	0.0	0.0	0.0	

Austin Tsutsumi & Associates, Inc.
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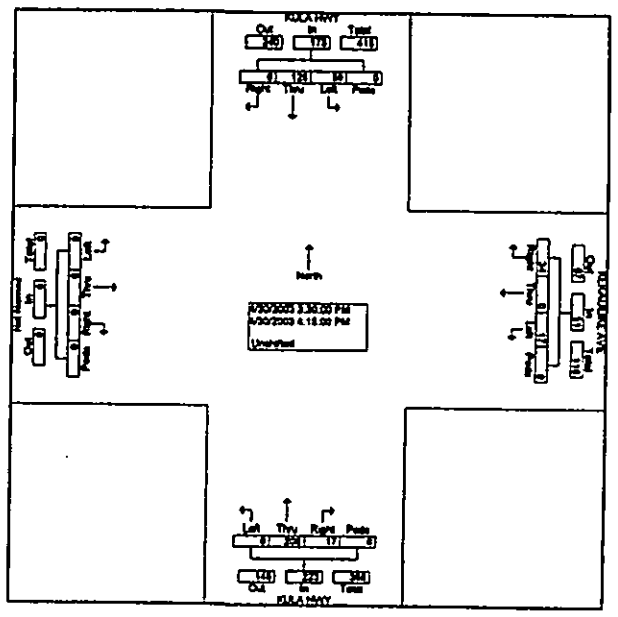
Major Street: Kula Hwy
Minor Street: Kekaulike Ave
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : kulkekpm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 2

	KULA HWY Southbound					KEKAULIKE AVE Westbound					KULA HWY Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection	03:30 PM																				
Volume	30	123	0	0	178	17	0	34	0	51	0	206	17	0	223	0	0	0	0	0	452
Percent	25.1	71.3	0.0	0.0		33.3	0.0	66.7	0.0		0.0	92.4	7.6	0.0		0.0	0.0	0.0	0.0		
04:00	17	40	0	0	57	6	0	15	0	21	0	73	6	0	79	0	0	0	0	0	157
Volume																					
Peak Factor					0.781					0.607					0.708						0.720
High Int.	04:00 PM					04:00 PM															
Volume	17	40	0	0	57	0	0	15	0	21	04:00 PM										
Peak Factor					0.781					0.607	0	73	0	0	73						
															0.708						



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Major Street: Kula Hwy
Minor Street: Pueo Dr
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulpueoam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 1

Groups Printed- Unshifted

	KULA HWY Southbound					Westbound					KULA HWY Northbound					PUEO DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection 07:00 AM																					
Volumes	6	18	1	0	25	0	0	0	0	0	0	45	0	0	45	0	0	1	0	1	71
Percent	24.0	72.0	4.0	0.0		0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		0.0	0.0	100.0	0.0		
07:00	6	18	1	0	25	0	0	0	0	0	0	45	0	0	45	0	0	1	0	1	71
Volume																					
Peak Factor																					0.859
High Int.	07:00 AM																				
Volume	6	18	1	0	25	0	0	0	0	0	0	45	0	0	45	0	0	1	0	1	
Peak Factor					0.903										0.833					0.361	
07:00 AM	6	18	1	0	25	0	0	0	0	0	0	45	0	0	45	0	0	1	0	1	71
07:15 AM	6	29	4	0	33	0	0	0	0	0	0	36	0	0	36	0	0	3	0	3	72
07:30 AM	6	32	0	0	32	0	0	0	0	0	1	43	0	0	44	3	0	0	0	3	81
07:45 AM	6	36	2	0	38	0	0	0	0	0	0	31	0	0	31	0	0	0	0	0	69
Total	24	115	7	0	146	0	0	0	0	0	1	155	0	0	156	3	0	4	0	7	309
08:00 AM	6	23	3	0	26	0	0	0	0	0	0	32	0	0	32	0	0	1	0	1	59
08:15 AM	6	26	2	0	28	0	0	0	0	0	0	36	0	0	36	0	0	0	0	0	67
Grand Total	54	227	14	0	311	0	0	0	0	0	1	267	0	0	268	11	0	5	0	16	535
Approach %	0.0	94.6	5.8	0.0		0.0	0.0	0.0	0.0		0.4	99.6	0.0	0.0		68.8	0.0	31.2	0.0		
Total %	0.0	44.3	2.8	0.0	46.8	0.0	0.0	0.0	0.0	0.0	0.2	49.9	0.0	0.0	50.1	2.1	0.0	0.9	0.0	3.0	

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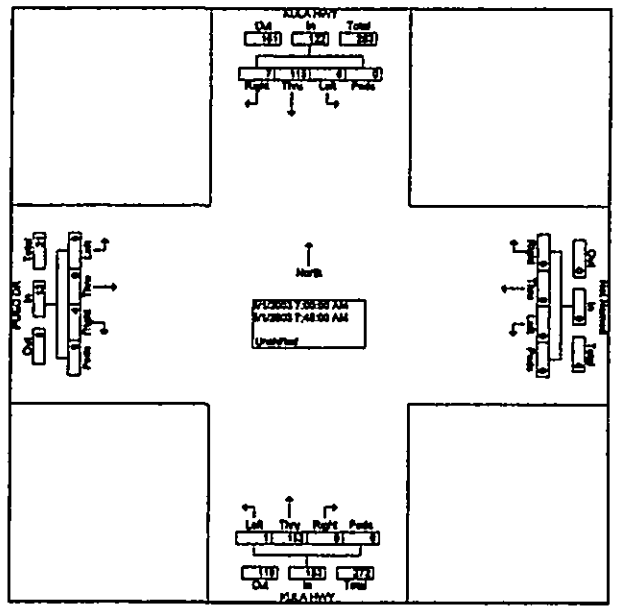
Major Street: Kula Hwy
Minor Street: Pueo Dr
Time of Count: 6:30 AM-8:30 AM
Weather: Clear

File Name : kulpueoam
Site Code : 00000000
Start Date : 05/01/2003
Page No : 2

	KULA HWY Southbound					Westbound					KULA HWY Northbound					PUEO DR Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Intersection 07:00 AM																					
Volumes	6	115	7	0	122	0	0	0	0	0	1	152	0	0	153	0	0	4	0	13	288
Percent	5.0	94.3	5.7	0.0		0.0	0.0	0.0	0.0		0.7	99.3	0.0	0.0		69.2	0.0	30.8	0.0		
07:30	0	32	0	0	32	0	0	0	0	0	1	45	0	0	46	3	0	0	0	3	81
Volume																					
Peak Factor																					0.889
High Int.	07:45 AM										07:30 AM					07:15 AM					
Volume	0	36	2	0	38	0	0	0	0	0	1	45	0	0	46	0	0	3	0	9	
Peak Factor					0.803										0.833					0.361	



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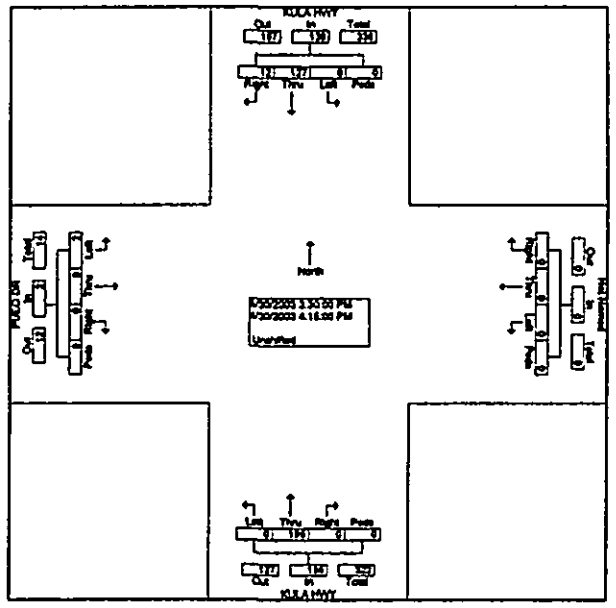
Major Street: Kula Hwy
Minor Street: Pueo Dr
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : lupueopm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 1

Groups Printed- Unshifted

Start Time	KULA HWY Southbound					Westbound					KULA HWY Northbound					PUEO DR Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection 03:30 PM																					
Volume	0	127	12	0	139	0	0	0	0	0	0	155	0	0	155	2	0	0	0	2	336
Percent	0.0	91.4	8.6	0.0		0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		
03:30	0	41	3	0	44	0	0	0	0	0	0	61	0	0	61	0	0	0	0	0	105
Peak Factor																					0.800
High Int. 03:30 PM											03:30 PM					04:00 PM					
Volume	0	41	3	0	44	0	0	0	0	0	0	61	0	0	61	1	0	0	0	1	
Peak Factor					0.795										0.795					0.500	



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Major Street: Kula Hwy
Minor Street: Pueo Dr
Time of Count: 2:45 PM-4:45 PM
Weather: Clear

File Name : lupueopm
Site Code : 00000000
Start Date : 04/30/2003
Page No : 2

Start Time	KULA HWY Southbound					Westbound					KULA HWY Northbound					PUEO DR Eastbound					Int. Total
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	
Peak Hour From 03:30 PM to 04:15 PM - Peak 1 of 1																					
Intersection 03:30 PM																					
Volume	0	127	12	0	139	0	0	0	0	0	0	155	0	0	155	2	0	0	0	2	336
Percent	0.0	91.4	8.6	0.0		0.0	0.0	0.0	0.0		0.0	100.0	0.0	0.0		100.0	0.0	0.0	0.0		
03:30	0	41	3	0	44	0	0	0	0	0	0	61	0	0	61	0	0	0	0	0	105
Peak Factor																					0.800
High Int. 03:30 PM											03:30 PM					04:00 PM					
Volume	0	41	3	0	44	0	0	0	0	0	0	61	0	0	61	1	0	0	0	1	
Peak Factor					0.795										0.795					0.500	

Weather: Clear
Location: KUIA HIGHWAY/Lau'ie Dr.
Counter #: 2.2
Other :

JAMAR Technologies, Inc.
TAS for Windows
Copyright 1999

Site Code : 00002000222
Start Date: 04/30/2003
File I.D. : 22
Page : 1

Begin Time	A			B-A			Combined			Wednesday
	A.M.	P.M.		A.M.	P.M.		A.M.	P.M.		
12:00 04/30	1	17		1	30		2	47		
12:15	0	19		0	28		0	47		
12:30	0	19		0	31		0	50		
12:45	0	17	72	0	24	113	0	41	163	
01:00	0	24		0	23		0	47		
01:15	0	21		0	19		0	40		
01:30	0	25		0	19		0	44		
01:45	0	34	104	0	39	100	0	73	204	
02:00	0	18		0	27		0	45		
02:15	0	31		0	32		0	63		
02:30	0	25		0	26		0	51		
02:45	0	26	100	0	21	106	0	47	206	
03:00	0	24		0	34		0	58		
03:15	0	25		0	28		0	53		
03:30	0	20		0	39		0	59		
03:45	0	26	104	0	46	167	0	72	271	
04:00	0	26		0	49		0	75		
04:15	0	28		0	37		0	65		
04:30	0	36		0	50		0	86		
04:45	0	29	119	0	48	184	0	77	303	
05:00	0	19		0	34		0	53		
05:15	0	32		0	31		0	63		
05:30	0	27		0	33		0	60		
05:45	0	21	159	0	32	145	0	53	247	
06:00	0	18		0	28		0	36		
06:15	0	17		0	38		0	55		
06:30	0	23		0	32		0	55		
06:45	0	37	83	0	77	115	0	94	198	
07:00	0	17		0	38		0	55		
07:15	0	17		0	14		0	31		
07:30	0	17		0	14		0	31		
07:45	0	16	67	0	13	79	0	29	146	
08:00	0	16		0	11		0	27		
08:15	0	12		0	10		0	22		
08:30	0	13		0	3		0	16		
08:45	0	9	52	0	5	29	0	14	81	
09:00	0	11		0	5		0	16		
09:15	0	10		0	9		0	19		
09:30	0	7		0	4		0	11		
09:45	0	1	33	0	2	20	0	3	53	
10:00	0	9		0	6		0	15		
10:15	39	4		20	2		59	6		
10:30	16	13		25	7		41	19		
10:45	32	10	34	22	2	36	53	12	52	
11:00	22	0		21	0		44	0		
11:15	10	4		25	6		44	10		
11:30	22	2		28	6		50	8		
11:45	21	5	11	24	4	17	47	9	23	
Totals	161	818	177	1238	1081	2056	338	2305	1967	
Day Totals		1047								
Split %	47.4%	45.6%	52.3%	54.9%						
Peak Hour	10:15	04:00	11:00	03:30	10:15	04:00				
Volume	99	119	100	191	197	303				
P.H.F.	.82	.92	.89	.80	.83	.98				

Weather: Clear
Location: KUIA HIGHWAY/Lau'ie Dr.
Counter #: 2.2
Other :

JAMAR Technologies, Inc.
TAS for Windows
Copyright 1999

Site Code : 00002000222
Start Date: 04/30/2003
File I.D. : 22
Page : 2

Begin Time	A			B-A			Combined			Thursday
	A.M.	P.M.		A.M.	P.M.		A.M.	P.M.		
12:00 05/01	1	2		1	2		2	4		
12:15	3	4		0	3		3	7		
12:30	0	0		0	0		0	0		
12:45	0	0	4	0	6	11	0	6	15	
01:00	0	0		0	0		0	0		
01:15	1	1		1	1		2	2		
01:30	1	0		0	1		1	1		
01:45	0	1	2	1	2	8	1	3	10	
02:00	2	0		0	2		2	2		
02:15	1	0		0	1		1	1		
02:30	1	0		0	1		1	1		
02:45	0	0	4	0	0	4	0	0	8	
03:00	0	0		0	0		0	0		
03:15	0	1		0	1		0	2		
03:30	0	1		0	1		0	2		
03:45	2	2	3	1	3	6	3	5	9	
04:00	3	2		2	3		5	5		
04:15	0	0		0	0		0	0		
04:30	0	2		0	2		0	4		
04:45	2	5	7	3	7	12	5	12	19	
05:00	1	5		0	1		1	6		
05:15	0	10		0	5		0	15		
05:30	0	6		0	6		0	12		
05:45	3	13	32	9	32	45	12	45	77	
06:00	3	12		8	9		11	21		
06:15	15	15		15	15		30	30		
06:30	28	19		39	24		67	43		
06:45	37	69	74	28	74	163	65	143	237	
07:00	16	36		36	56		52	92		
07:15	30	25		35	40		65	65		
07:30	29	49		45	25		74	74		
07:45	36	111	130	22	130	249	58	241	379	
08:00	22	22		24	24		46	46		
08:15	22	36		36	36		58	72		
08:30	23	36		36	63		59	99		
08:45	29	97		31	135	222	60	232	292	
09:00	16	17		17	16		33	33		
09:15	19	23		23	19		42	42		
09:30	29	31		31	31		51	62		
09:45	24	79		26	97	176	50	176	226	
10:00	23	25		25	23		48	48		
10:15	32	21		21	19		53	40		
10:30	*	*		*	*		*	*		
10:45	*	*	*	*	*	91	*	*	91	
11:00	*	*		*	*		*	*		
11:15	*	*		*	*		*	*		
11:30	*	*		*	*		*	*		
11:45	*	*	*	*	*	*	*	*	*	
Totals	457	657	530	523	987	1517	987	1180	2167	
Day Totals		1114								
Split %	46.3%	53.7%	33.7%	66.3%						
Peak Hour	07:15	06:45	06:45							
Volume	118	144	356							
P.H.F.	.81	.78	.86							

Weather: Clear
Location: Kula Hwy/LAU'IE DRIVE
Counter #:2.5
Other :

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TAS for Windows
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Site Code : 00000000000
Start Date: 04/30/2003
File I.D. : 25
Page : 1

Begin Time	A A.M.	A P.M.	B-A A.M.	B-A P.M.	Combined A.M.	Combined P.M.	Wednesday
12:00 04/30	1	2		2	1	4	
12:15	1	1		1	1	2	
12:30	1	1		2	1	3	
12:45	2	8	4	9	6	17	
01:00	2	2	2	2	4	4	
01:15	1	0	1	1	2	1	
01:30	2	2	0	0	2	2	
01:45	2	6	4	7	6	13	
02:00	2	2	0	0	2	2	
02:15	1	1	1	1	2	2	
02:30	1	1	1	1	2	2	
02:45	3	10	2	4	5	14	
03:00	3	0	2	3	5	3	
03:15	2	7	3	5	5	12	
03:30	4	4	5	5	9	9	
03:45	3	11	3	14	6	25	
04:00	1	1	0	1	1	2	
04:15	2	2	6	6	8	8	
04:30	1	3	3	3	4	6	
04:45	2	6	3	12	5	18	
05:00	1	1	1	1	2	2	
05:15	2	5	0	2	2	7	
05:30	5	5	0	0	5	5	
05:45	1	12	5	7	6	19	
06:00	2	2	0	0	2	2	
06:15	5	0	0	5	5	5	
06:30	4	2	2	4	6	6	
06:45	3	9	2	11	5	20	
07:00	1	3	1	3	2	6	
07:15	3	0	3	0	6	0	
07:30	0	1	1	0	1	1	
07:45	1	9	0	0	1	9	13
08:00	0	0	2	2	2	2	
08:15	0	0	2	2	2	2	
08:30	0	0	1	1	1	1	
08:45	0	1	1	4	1	5	
09:00	2	2	1	1	3	3	
09:15	0	0	0	0	0	0	
09:30	1	1	0	0	1	1	
09:45	2	5	0	2	2	7	
10:00	2	0	1	1	3	1	
10:15	1	0	0	0	1	0	
10:30	3	0	0	0	3	0	
10:45	0	6	3	7	3	13	2
11:00	3	2	3	4	6	6	
11:15	2	0	1	0	3	0	
11:30	1	0	0	0	1	0	
11:45	1	0	0	0	1	0	2
Totals	77	143	86	155	163	298	
Day Totals	220		241		461		
Split %	47.7%	52.3%	35.7%	64.3%	35.4%	64.6%	

	A	B-A	Combined
Peak Hour	11:00	04:45	03:00
Volume	9	13	25
P.H.F.	.75	.65	.69

Weather: Clear
Location: Kula Hwy/LAU'IE DRIVE
Counter #:2.5
Other :

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Site Code : 00000000000
Start Date: 05/30/2003
File I.D. : 25
Page : 1

Begin Time	A A.M.	A P.M.	B-A A.M.	B-A P.M.	Combined A.M.	Combined P.M.	Thursday
12:00 05/01	0	0	0	0	0	0	
12:15	0	0	0	0	0	0	
12:30	0	0	0	0	0	0	
12:45	0	0	0	0	0	0	
01:00	0	0	0	0	0	0	
01:15	0	0	0	0	0	0	
01:30	0	0	0	0	0	0	
01:45	0	0	0	0	0	0	
02:00	0	0	0	0	0	0	
02:15	0	0	0	0	0	0	
02:30	0	0	0	0	0	0	
02:45	0	0	0	0	0	0	
03:00	0	0	0	0	0	0	
03:15	0	0	0	0	0	0	
03:30	0	0	0	0	0	0	
03:45	0	0	0	0	0	0	
04:00	0	0	0	0	0	0	
04:15	0	0	0	0	0	0	
04:30	0	0	0	0	0	0	
04:45	0	0	0	0	0	0	
05:00	0	0	0	0	0	0	
05:15	0	0	0	0	0	0	
05:30	1	0	0	0	1	0	
05:45	0	1	1	1	1	2	
06:00	0	0	2	2	2	2	
06:15	0	0	0	0	0	0	
06:30	0	0	2	2	2	2	
06:45	1	9	6	6	7	15	
07:00	2	5	5	2	7	7	
07:15	3	0	1	0	4	0	
07:30	1	0	1	0	2	0	
07:45	9	12	3	10	12	22	
08:00	1	0	0	0	1	0	
08:15	1	0	1	2	2	2	
08:30	1	0	2	2	3	2	
08:45	3	10	3	7	6	17	
09:00	2	0	1	2	3	2	
09:15	2	0	1	1	3	1	
09:30	0	0	0	0	0	0	
09:45	1	5	5	7	6	12	
10:00	0	0	0	0	0	0	
10:15	0	0	0	0	0	0	
10:30	0	0	0	0	0	0	
10:45	0	0	0	0	0	0	2
11:00	0	0	0	0	0	0	
11:15	0	0	0	0	0	0	
11:30	0	0	0	0	0	0	
11:45	0	0	0	0	0	0	
Totals	42	42	31	31	73	73	
Day Totals	84		62		146		
Split %	57.5%	42.5%	50.0%	50.0%	50.0%	50.0%	

	A	B-A	Combined
Peak Hour	08:30	08:30	08:30
Volume	16	20	36
P.H.F.	.67	.83	.90

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APPENDIX B

LEVEL OF SERVICE CRITERIA

LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 2000)

The level of service criteria for unsignalized intersections is defined as the average total delay, in seconds per vehicle. As used here, total delay is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Total Delay (sec/veh)
A	≤10
B	> 10 and ≤15
C	> 15 and ≤25
D	> 25 and ≤35
E	> 35 and ≤50
F	> 50

LEVEL OF SERVICE OF SIGNALIZED INTERSECTIONS (HCM 2000)

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption and lost travel time. Specifically, level-of-service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The criteria are given in Table A-1.

Table A-1. Level-of Service Criteria for Signalized Intersections

Level of Service	Stopped Delay per Vehicle (sec.)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

Using the HCM calculation procedure, LOS is determined for each individual approach, as well as for the intersection as a whole.

Level-of-service A describes operations with very low delay, up to 10.0 seconds per vehicle. This level of service occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

Level-of-service B describes operations with delay greater than 10.0 and up to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

Level-of-service C describes operations with delay greater than 20.0 and up to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

Level-of-service D describes operations with delay greater than 35.0 and up to 55.0 seconds per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

Level-of-service E describes operations with delay greater than 55.0 and up to 80.0 seconds per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths and high v/c ratios. Individual cycle failures are frequent occurrences.

Level-of-service F describes operations with delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

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APPENDIX C

LEVEL OF SERVICE CALCULATIONS

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APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Existing Conditions

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2003
Comment: EXISTING

Site Information

Jurisdiction/Date: KULA, MAUI 7/2/2003
Major Street: HALEAKALA HWY
Minor Street: OLD HALEAKALA HWY

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	T	T	R	
Lane 2	T		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)		695			0		282		2			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		772			0		313		2			
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	R	2	609	.003	<1	10.9	B	70.2
	2	L	313	334	.938	10	70.6	F	
	3								F
SB	1								
	2								
	3								
		①							
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2003
Comment: EXISTING

Site Information

Jurisdiction/Date: KULA, MAUI 6/27/2003
Major Street: HALEAKALA HIGHWAY
Minor Street: MAKANI ROAD

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	TR	TR	R	R
Lane 2	T	L	LT	LT
Lane 3	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)	2	2	0	18	816	40	15	115	132	76	97	344
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	2	2	2	2	2	2	2	2	2	2	2	2
Flow rate	2	2	0	20	907	44	17	128	147	84	108	382
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	147	1083	.136	<1	8.8	A	24.8
	2	LT	145	239	.608	4	41	E	
	3								C
SB	1	R	382	269	1.418	21	244.4	F	249.5
	2	LT	192	141	1.359	12	259.9	F	
	3								F
		①	2	718	.003	<1	10	A	
		④	20	1619	.012	<1	7.3	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	EV
Agency or Company	ATA
Analysis Period/Year	PM PEAK 2003
Comment	EXISTING

Site Information

Jurisdiction/Date	KULA, MAUI 6/27/2003
Major Street	HALEAKALA HIGHWAY
Minor Street	MAKANI ROAD

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)	TR			TR			R			R		
Lane 2	T			L			LT			LT		
Lane 3	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)	156	515	7	30	524	21	5	73	21	8	59	81
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	2	2	2	2	2	2	2	2	2	2	2	2
Flow rate	173	572	8	33	582	23	6	81	23	9	66	90
Flare storage (# of vehs)									0			0
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ R Movement 5 _____ R

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	23	707	.033	<1	10.3	B	255.9
	2	LT	87	66	1.31	7	320.9	F	F
	3								
SB	1	R	90	448	.201	1	15	B	220.1
	2	LT	75	48	1.557	7	466.1	F	F
	3								
		①	173	968	.179	1	9.5	A	
		④	33	990	.034	<1	8.8	A	

1 of 1

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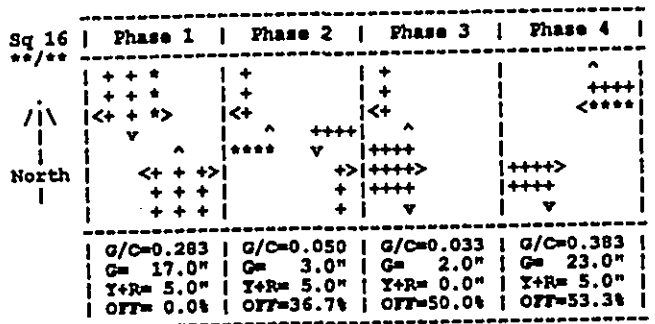
Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing

01/15/04
15:51:37

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.60 Vehicle Delay 24.9 Level of Service C+

Sq 16 **/**



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	HCM LOS	Queue Model 1
SB Approach								23.3	C+	
RT	12/1	0.243	0.450	659	713	297	0.417	13.0	B+	168 ft
TH	12/1	0.187	0.283	460	528	276	0.523	19.0	B	186 ft
LT	12/1	0.294	0.283	245	302	256	0.848	39.9	*D+	226 ft
NB Approach								17.6	B	
RT	12/1	0.034	0.417	600	660	9	0.014	10.3	B+	5 ft
TH	12/1	0.160	0.283	460	528	227	0.430	18.1	B	148 ft
LT	12/1	0.000	0.283	206	260	31	0.119	16.2	B	19 ft
WB Approach								29.5	C	
RT	12/1	0.216	0.383	529	607	250	0.412	17.3	B	170 ft
TH	12/1	0.381	0.383	648	714	644	0.902	34.3	*C	544 ft
LT	12/1	0.014	0.050	49	76	7	0.080	27.6	C	6 ft
EB Approach								20.9	C+	
RT	12/1	0.046	0.417	600	660	17	0.026	10.4	B+	9 ft
TH	24/2	0.052	0.417	1439	1475	118	0.080	10.6	B+	30 ft
LT	12/1	0.084	0.083	93	137	94	0.639	35.6	*D+	81 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing

01/15/04
15:51:45

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA		NONCBD		
SIMULATION PERIOD		15		
LEVELOFSERVICE		C	S	
NODELOCATION		0	0	
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	267	248	230	225	580	6	8	204	28	15	106	85
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1068	1583	1863	1770	1583	1863	919	1583	3539	1770

Phasing Parameters

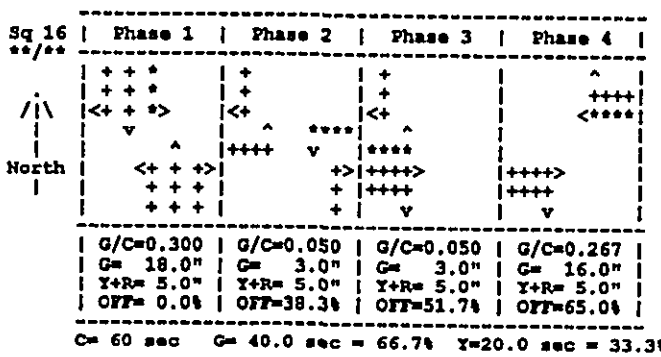
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	120	10		PEDTIME	0.0	0
GREENTIMES	17.00	3.00	2.00	23.00			
YELLOWTIMES	5.00	5.00	0.00	5.00			
CRITICALS	3	12	0	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Existing

01/15/04
15:43:54

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.56 Vehicle Delay 22.6 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								19.0	B	
RT	12/1	0.168	0.567	866	897	172	0.192	6.8	A	75 ft
TH	12/1	0.210	0.300	492	559	319	0.571	19.1	B	216 ft
LT	12/1	0.300	0.300	126	164	126	0.746	35.4	*D+	106 ft
NB Approach								22.7	C+	
RT	12/1	0.047	0.433	629	686	18	0.026	9.8	A	10 ft
TH	12/1	0.260	0.300	492	559	413	0.739	24.1	C+	306 ft
LT	12/1	0.000	0.300	195	246	46	0.187	15.9	B	28 ft
WB Approach								28.0	C	
RT	12/1	0.190	0.267	332	422	207	0.491	23.4	C+	157 ft
TH	12/1	0.253	0.267	423	497	397	0.799	30.4	*C	323 ft
LT	12/1	0.017	0.050	49	76	9	0.102	27.7	*C	7 ft
EB Approach								20.5	C+	
RT	12/1	0.077	0.400	570	633	46	0.073	11.3	B+	26 ft
TH	24/2	0.109	0.400	1375	1416	296	0.209	11.9	B+	81 ft
LT	12/1	0.178	0.183	253	324	244	0.753	32.8	*C	201 ft

Hawaiian Homelands Subdivisions at Waiohuli 01/15/04
PM Peak Hour of Traffic 15:44:01
Existing

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	155	287	113	186	357	8	16	372	41	41	266	220
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	565	1583	1863	1770	1583	1863	819	1583	3539	1770

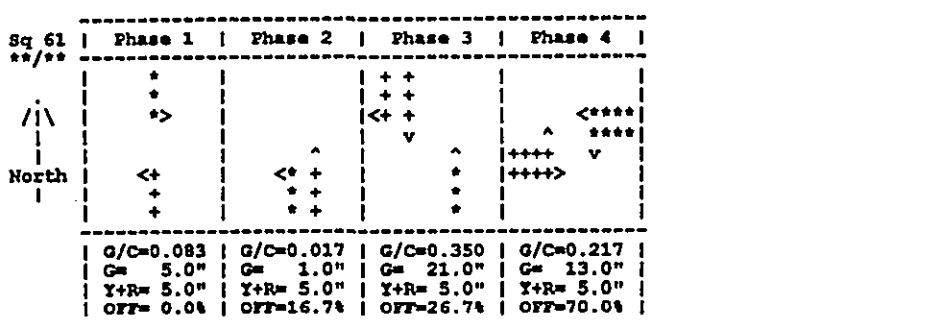
Phasing Parameters

SEQUENCES	16	16				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	120	10		PEDTIME	0.0 0
GREENTIMES	18.00	3.00	3.00	16.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	6	12	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli 01/15/04
AM Peak Hour of Traffic 15:44:49
Existing

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.70 Vehicle Delay 24.4 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Modal 1
SB Approach								19.5	B	
RT	12/1	0.012	0.350	472	554	1	0.002	13.9	B+	1 ft
TH	12/1	0.220	0.350	583	652	336	0.515	17.7	B	230 ft
LT	12/1	0.065	0.083	93	137	68	0.463	28.5	*C	56 ft
NB Approach								25.5	C+	
TH	12/1	0.412	0.450	793	838	716	0.854	23.4	*C+	534 ft
LT	12/1	0.175	0.183	253	324	240	0.741	31.9	*C	196 ft
WB Approach								31.6	C	
TH+LT	12/1	0.207	0.217	230	294	218	0.741	31.6	*C	178 ft
EB Approach								21.2	C+	
TH+LT	12/1	0.133	0.217	331	403	179	0.444	21.2	C+	125 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing

01/15/04
15:44:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	1	302	61	161	95	101	108	644	216	420	160	1
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1359	0	0	1863	1770	0	1859	0

Phasing Parameters

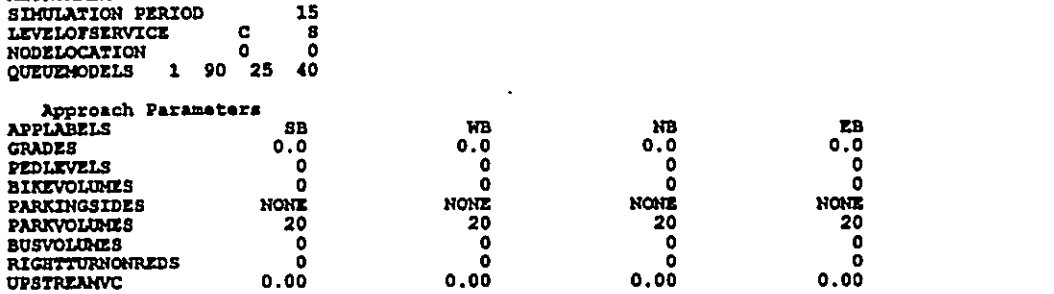
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	5.00	1.00	21.00	13.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	8	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Existing

01/15/04
15:45:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.56 Vehicle Delay 18.1 Level of Service B



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								19.0	B	
RT	12/1	0.012	0.367	501	581	1	0.002	13.4	B+	1 ft
TH	12/1	0.254	0.367	616	683	398	0.583	18.3	*B	275 ft
LT	12/1	0.055	0.117	143	200	54	0.262	24.8	*C+	42 ft
NB Approach								16.3	B	
TH	12/1	0.323	0.483	861	900	537	0.597	12.3	B+	307 ft
LT	12/1	0.192	0.233	343	413	268	0.649	24.3	*C+	200 ft
WB Approach								24.7	C+	
TH+LT	12/1	0.105	0.150	167	227	105	0.457	24.7	*C+	80 ft
EB Approach								23.0	C+	
TH+LT	12/1	0.063	0.150	208	278	69	0.248	23.0	C+	49 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Existing

01/15/04
15:45:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	1	358	49	77	52	42	35	483	241	207	61	1
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLN	NORM	NORM	FFLN	NORM	NORM	FFLN	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1533	0	0	1863	1770	0	1854	0

Phasing Parameters

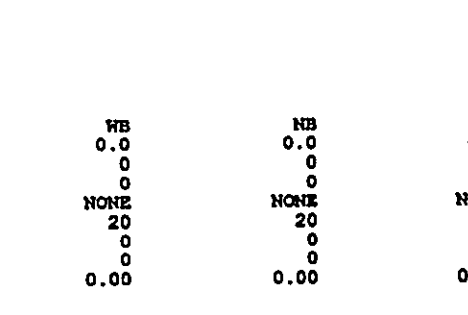
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	10		PEDTIME	0.0 0
GREENTIMES	7.00	2.00	22.00	9.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing

01/15/04
15:46:52

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.60 Vehicle Delay 20.2 Level of Service C+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								22.1	C+	
RT	12/1	0.195	0.567	866	897	217	0.242	7.2	*A	96 ft
LT	12/1	0.378	0.400	655	708	612	0.864	27.4	C+	480 ft
WB Approach								24.3	C+	
TH	12/1	0.147	0.433	759	807	203	0.252	11.0	B+	103 ft
LT	12/1	0.081	0.083	308	354	303	0.856	33.2	*C	256 ft
EB Approach								13.7	B+	
RT	12/1	0.206	0.750	1188	1188	234	0.197	2.6	A	66 ft
TH	12/1	0.207	0.267	427	497	314	0.632	22.0	C+	225 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	183	273	195	0	551	211	283	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing

01/15/04
15:46:59

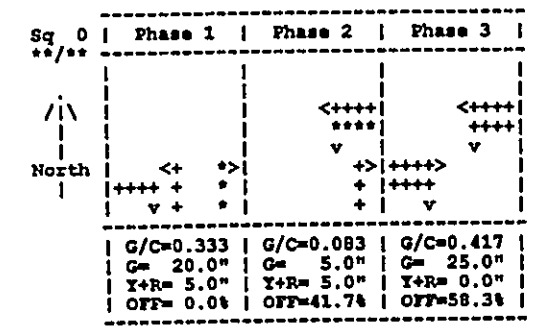
SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	24.00	5.00	21.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.45 Vehicle Delay 10.7 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Pad= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								13.8	B+	
RT	12/1	0.266	0.500	748	792	336	0.424	11.2	*B+	178 ft
LT	12/1	0.209	0.333	528	590	298	0.505	16.7	B	191 ft
WB Approach								12.1	B+	
TH	12/1	0.103	0.500	895	931	129	0.139	8.1	A	56 ft
LT	12/1	0.003	0.083	517	560	362	0.646	13.5	*B+	222 ft
EB Approach								6.8	A	
RT	12/1	0.357	0.750	1188	1188	494	0.416	3.8	A	162 ft
TH	12/1	0.132	0.333	558	621	178	0.287	15.0	B+	104 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	116	326	302	0	268	445	160	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli 01/15/04
PM Peak Hour of Traffic 15:47:30
Existing

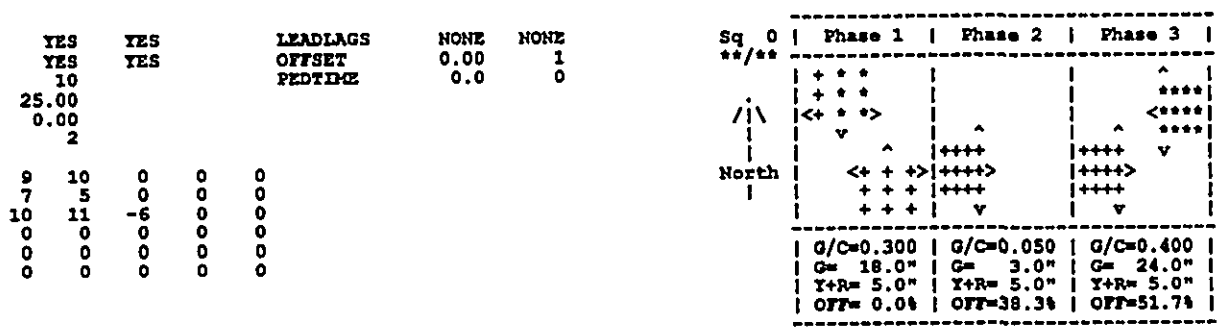
SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters									
SEQUENCES	0	0					LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES			OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES			PEDTIME	0.0	0
CYCLES	60	120	10						
GREENTIMES	20.00	5.00	25.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli 01/15/04
AM Peak Hour of Traffic 15:45:48
Existing

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.46 Vehicle Delay 14.1 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								19.4	B	
RT	12/1	0.204	0.300	395	475	231	0.486	20.7	C+	160 ft
TH+LT	12/1	0.105	0.300	355	417	94	0.225	16.0	*B	57 ft
NB Approach								19.2	B	
RT+TH+LT	12/1	0.212	0.300	429	494	280	0.567	19.2	B	191 ft
WB Approach								15.1	B	
RT+TH+LT	12/1	0.268	0.400	588	642	362	0.564	15.1	*B	225 ft
EB Approach								8.6	A	
RT+TH	12/1	0.287	0.533	957	987	462	0.468	9.1	A	227 ft
LT	12/1	0.140	0.533	913	944	181	0.192	7.4	A	76 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Hakawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	208	36	49	59	218	49	150	74	28	19	397	163
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1391	0	0	1605	0	0	1646	0	0	1850	1770

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Existing
01/15/04
15:45:55

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

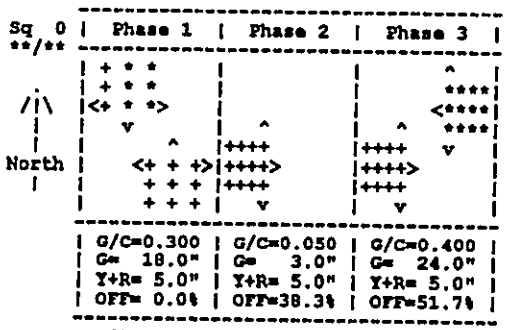
SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Existing

01/15/04
15:46:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.40 Vehicle Delay 13.9 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								21.8	C+	
RT	12/1	0.241	0.300	395	475	293	0.617	23.9	C+	213 ft
TH+LT	12/1	0.105	0.300	406	470	108	0.230	16.0	*B	65 ft
NB Approach								16.0	B	
RT+TH+LT	12/1	0.102	0.300	447	512	115	0.225	16.0	B	69 ft
WB Approach								14.0	B+	
RT+TH+LT	12/1	0.236	0.400	628	682	332	0.487	14.0	*B+	197 ft
EB Approach								8.0	A	
RT+TH	12/1	0.179	0.533	945	975	255	0.262	7.7	A	111 ft
LT	12/1	0.229	0.533	913	944	333	0.353	8.3	A	153 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Existing

01/15/04
15:46:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	264	54	43	60	203	35	27	59	17	28	202	300
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1566	0	0	1705	0	0	1706	0	0	1829	1770

Hawaiian Homelands Subdivisions at Waiohuli 01/15/04
PM Peak Hour of Traffic 15:46:27
Existing

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK HOUR 2003
Comment: EXISTING

Site Information

Jurisdiction/Date: KULA, MAUI 12/23/200
Major Street: KULA HWY
Minor Street: KKHS DRWY

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			R			LTR			R		
Lane 2	L			LT						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)	231	570	1	0	830	131	2	1	2	18		125
PHF	.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
Flow rate	257	633	1	0	922	146	2	1	2	20		139
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
EB	1	LTR	5	25	.203	1	185.5	F	185.5 F
	2								
	3								
WB	1	R	125	326	.384	2	22.8	C	62.4 F
	2	L	20	26	.759	2	310.2	F	
	3								
		①	257	649	.396	2	14.1	B	
		④	0	944	0	<1	8.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	TL		Jurisdiction/Date	KULA, MAUI	12/23/200
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	PM PEAK HOUR	2003	Minor Street	KKHS DRWY	
Comment	EXISTING				

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	L	LT		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)	20	595	6	3	719	3	2	0	1	7		30
PHF	.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
Flow rate	22	661	7	3	799	3	2	0	1	8		33
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
EB	1	LTR	4	115	.035	<1	37.3	E	37.3 E
	2								
	3								
WB	1	R	33	384	.086	<1	15.3	C	21.3 C
	2	L	8	95	.084	<1	46.5	E	
	3								
		①	22	817	.027	<1	9.5	A	
		④	3	917	.004	<1	8.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	TL		Jurisdiction/Date	KULA, MAUI	10/22/200
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	AM PEAK HOUR	2003	Minor Street	AAPUEO PKWY	
Comment	EXISTING				

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	R	T	R	
Lane 2	T	L	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)		382	219	58	800		164		35			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		424	243	64	889		182		39			
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	39	628	.062	<1	11.1	B	216.2 F
	2	L	182	135	1.35	12	260.1	F	
	3								
WB	1								
	2								
	3								
		①							
		④	64	917	.07	<1	9.2	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 10/22/200
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK HOUR 2003	Minor Street	AAPUEO PKWY
Comment	EXISTING		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	R	T	R	
Lane 2	T	L	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)		538	57	9	507		217		31			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		598	63	10	563		241		34			
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	34	501	.068	<1	12.7	B	143.9
	2	L	241	207	1.166	12	162.4	F	F
	3								
WB	1								
	2								
	3								
		①							
		④	10	923	.011	<1	8.9	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 5/13/2003
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2003	Minor Street	OMAOPIO RD
Comment			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	LTR	LTR
Lane 2				
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)	43	303	32	20	493	3	31	7	15	2	25	196
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	48	337	36	22	548	3	34	8	17	2	28	218
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
EB	1	LTR	59	127	.466	2	56.1	F	56.1
	2								F
	3								
WB	1	LTR	248	445	.557	3	22.8	C	22.8
	2								C
	3								
		①	48	1014	.047	<1	8.7	A	
		④	22	1181	.019	<1	8.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 5/13/2003
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2003	Minor Street	OMAOPIO RD
Comment			

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			LTR			LTR		
Lane 2												
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)	109	361	34	16	368	2	27	14	10	4	11	79
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	401	38	18	409	2	30	16	11	4	12	88
Flare storage (# of vehs)									0			0
Median storage (# of vehs)						1	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
EB	1	LTR	57	163	.35	1	38.6	E	38.6 E
	2								
	3								
WB	1	LTR	104	444	.234	1	15.6	C	15.6 C
	2								
	3								
		①	121	1142	.106	<1	8.5	A	
		④	18	1116	.016	<1	8.3	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 5/13/2003
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2003	Minor Street	KEKAULIKE AVE
Comment			

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						LR		
Lane 2												
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)	40	115			190	14				22		70
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	44	128			211	16				24		78
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	LR	102	737	.138	<1	10.7	B	10.7 B
	2								
	3								
		①	44	1336	.033	<1	7.8	A	
		④							

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2003
Comment:

Site Information

Jurisdiction/Date: KULA, MAUI 5/13/2003
Major Street: KULA HWY
Minor Street: KEKAULIKE AVE

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						LR		
Lane 2												
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)	50	128			206	17				17		34
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	142			229	19				19		38
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	LR	57	673	.085	<1	10.8	B	10.8
	2								B
	3								
		①	56	1312	.042	<1	7.9	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2003
Comment:

Site Information

Jurisdiction/Date: KULA, MAUI 5/13/2003
Major Street: KULA HWY
Minor Street: PUEO DR

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			LT			LR					
Lane 2												
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)		115	7	1	152		9		4			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		128	8	1	169		10		4			
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	LR	14	739	.019	<1	10	A	10
	2								A
	3								
WB	1								
	2								
	3								
		①							
		④	1	1443	.001	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	TL		Jurisdiction/Date	KULA, MAUI	5/13/2003
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	PM PEAK	2003	Minor Street	PUEO DR	
Comment					

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		127	12	1	195		2		1			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		141	13	1	217		2		1			
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	LR	3	700	.004	<1	10.2	B	10.2
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	1	1420	.001	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	TL		Jurisdiction/Date	KULA, MAUI	5/13/2003
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	AM PEAK	2003	Minor Street	LAUIE DR	
Comment					

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		111	12	1	138		10		1			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		123	13	1	153		11		1			
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	LR	12	716	.017	<1	10.1	B	10.1
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	1	1441	.001	<1	7.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	TL	Jurisdiction/Date	KULA, MAUI 5/13/2003
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2003	Minor Street	LAUIE DR
Comment			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		109	12	1	191		12		1			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		121	13	1	212		13		1			
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	LR	14	665	.021	<1	10.5	B	10.5
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	1	1444	.001	<1	7.5	A	

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Base Year 2007 Scenario A

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2007
Comment: BASE YEAR 2007 EXCL OTHER DEVELOPME

Site Information

Jurisdiction/Date: KULA, MAUI 4/27/2004
Major Street: HALEAKALA HWY
Minor Street: OLD HALEAKALA HWY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		T			T			R				
Lane 2		T						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)		295			0		815		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		328			0		906		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	R	6	849	.007	<1	9.3	A	215.2
	2	L	906	639	1.419	42	216.6	F	
	3								F
SB	1								
	2								
	3								
		①							
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2007
Comment: BASE YEAR 2007 EXCL OTHER DEVELOPME

Site Information

Jurisdiction/Date: KULA, MAUI 4/27/2004
Major Street: HALEAKALA HWY
Minor Street: OLD HALEAKALA HWY

Input Data

Lane Configuration	EB			WB			NB			SB		
Lane 1 (curb)		T			T			R				
Lane 2		T						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)		775			0		295		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		861			0		328		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	R	6	570	.011	<1	11.4	B	125.6
	2	L	328	293	1.121	14	127.7	F	
	3								F
SB	1								
	2								
	3								
		①							
		④							

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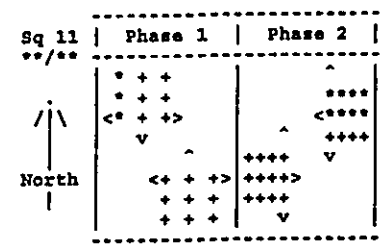
Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:43:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.73 Vehicle Delay 38.6 Level of Service D+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								48.4	D	
RT	12/1	0.344	0.278	276	440	406	0.923	58.9	*E+	536 ft
TH+LT	12/1	0.231	0.278	294	412	217	0.527	28.8	C	218 ft
NB Approach								25.9	C+	
RT	12/1	0.189	0.278	276	440	106	0.241	26.4	C+	104 ft
TH+LT	12/1	0.160	0.278	358	489	117	0.239	25.4	C+	107 ft
WB Approach								44.8	D+	
RT+TH	12/1	0.639	0.611	1048	1131	1106	0.978	45.5	*D	1333 ft
LT	12/1	0.134	0.611	574	647	22	0.034	9.9	A	16 ft
EB Approach								8.2	A	
RT+TH	24/2	0.166	0.611	2141	2156	300	0.139	7.5	A	80 ft
LT	12/1	0.225	0.611	59	75	39	0.470	13.7	B+	30 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:43:29

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

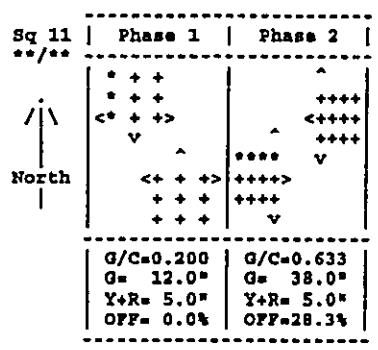
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	365	105	90	45	950	20	95	90	15	5	265	35
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1482	0	0	1850	1059	1583	1759	0	0	3529	135

Phasing Parameters

SEQUENCES	11	11			LEADLAGS	NONE	NONE	
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1	
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0	
CYCLES	90	90	90					
GREENTIMES	25.00	55.00						
YELLOWTIMES	5.00	5.00						
CRITICALS	1	5						
EXCESS	0							

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.38 Vehicle Delay 9.4 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								21.7	C+	
RT	12/1	0.115	0.200	225	317	94	0.297	22.8	*C+	71 ft
TH+LT	12/1	0.076	0.200	286	357	83	0.232	20.5	C+	56 ft
NB Approach								20.5	C+	
RT	12/1	0.059	0.200	225	317	28	0.088	20.1	C+	21 ft
TH+LT	12/1	0.082	0.200	294	366	95	0.260	20.6	C+	65 ft
WB Approach								9.2	A	
RT+TH	12/1	0.373	0.633	1139	1172	622	0.531	9.4	A	353 ft
LT	12/1	0.000	0.633	426	469	39	0.083	6.3	A	19 ft
EB Approach								5.5	A	
RT+TH	24/2	0.212	0.633	2236	2236	661	0.296	5.0	A	127 ft
LT	12/1	0.394	0.633	332	365	183	0.501	7.0	*A	86 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	65	10	25	535	35	25	80	5	10	585	165
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1785	0	0	1850	741	1583	1830	0	0	3530	577

Phasing Parameters

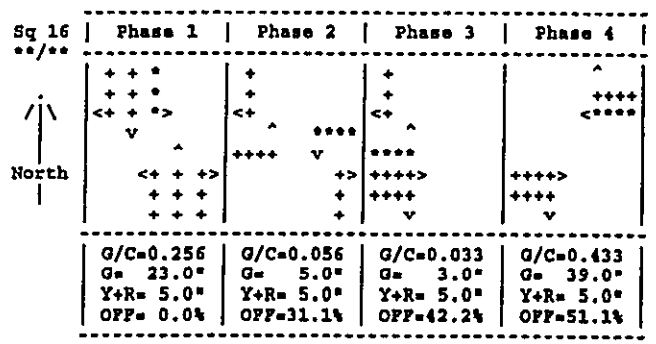
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	12.00	38.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	1	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:46:16

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.66 Vehicle Delay 40.2 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								36.2	D+	
RT	12/1	0.296	0.456	623	721	311	0.431	18.5	B	249 ft
TH	12/1	0.234	0.256	335	476	289	0.607	31.8	C	299 ft
LT	12/1	0.311	0.256	217	323	294	0.902	59.2	*E+	386 ft
NB Approach								26.1	C+	
RT	12/1	0.128	0.367	451	581	11	0.019	18.2	B	10 ft
TH	12/1	0.155	0.256	335	476	111	0.233	26.8	C+	104 ft
LT	12/1	0.157	0.256	111	171	33	0.180	26.6	C+	32 ft
WB Approach								45.2	D	
RT	12/1	0.295	0.433	546	686	289	0.421	22.5	C+	268 ft
TH	12/1	0.481	0.433	684	807	783	0.970	53.6	*D	982 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								41.1	D+	
RT	12/1	0.132	0.522	712	827	17	0.021	13.2	B+	15 ft
TH	24/2	0.156	0.522	1729	1848	244	0.132	14.0	B+	102 ft
LT	12/1	0.217	0.144	74	243	233	0.910	71.4	*E	323 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:46:31

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

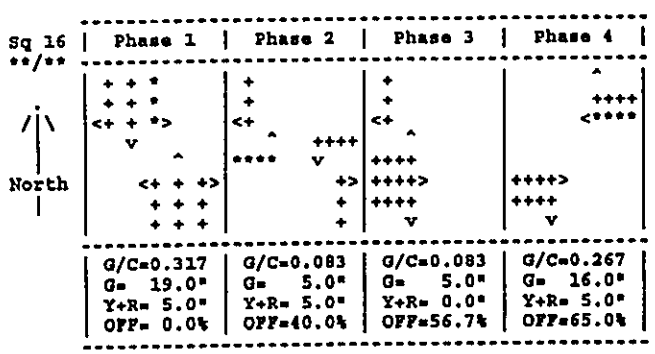
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	280	260	265	260	705	5	10	100	30	15	220	210
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1277	1583	1863	1770	1583	1863	717	1583	3539	1770

Phasing Parameters

SEQUENCES	16	16				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	90	90		PEDTIME	0.0 0
GREENTIMES	23.00	5.00	3.00	39.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	6	12	5		
EXCESS	0					

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.59 Vehicle Delay 25.5 Level of Service C+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								22.1	C+	
RT	12/1	0.175	0.567	866	897	183	0.204	6.9	A	80 ft
TH	12/1	0.221	0.317	525	590	339	0.575	18.5	B	227 ft
LT	12/1	0.349	0.317	128	165	144	0.847	50.0	*D	135 ft
NB Approach								22.0	C+	
RT	12/1	0.052	0.483	717	765	22	0.029	8.2	A	11 ft
TH	12/1	0.273	0.317	525	590	439	0.744	23.4	C+	323 ft
LT	12/1	0.000	0.317	200	250	50	0.200	15.4	B	30 ft
WB Approach								28.3	C	
RT	12/1	0.192	0.267	332	422	211	0.500	23.6	C+	160 ft
TH	12/1	0.255	0.267	423	497	400	0.805	30.8	*C	326 ft
LT	12/1	0.018	0.083	93	137	11	0.075	25.6	C+	9 ft
EB Approach								28.9	C	
RT	12/1	0.081	0.350	472	554	50	0.090	14.7	B+	35 ft
TH	24/2	0.128	0.350	1170	1239	361	0.291	15.6	B	123 ft
LT	12/1	0.188	0.167	225	295	261	0.885	50.1	*D	248 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	165	305	130	190	360	10	20	395	45	45	325	235
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	537	1583	1863	1770	1583	1863	791	1583	3539	1770

Phasing Parameters

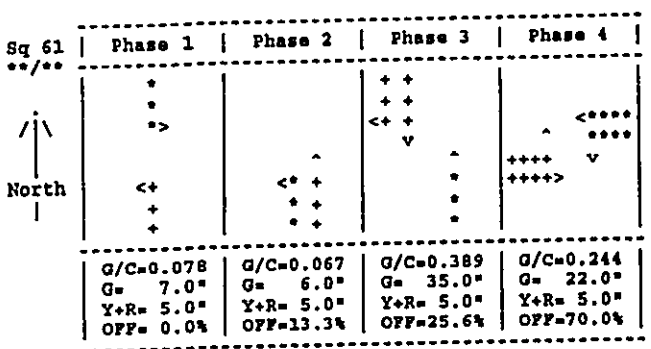
SEQUENCES	16	16			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	60	180	10				
GREENTIMES	19.00	5.00	5.00	16.00			
YELLOWTIMES	5.00	5.00	0.00	5.00			
CRITICALS	3	12	0	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:50:19

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.79 Vehicle Delay 39.9 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								31.6	C	
RT	12/1	0.123	0.389	463	616	6	0.010	19.0	B	6 ft
TH	12/1	0.331	0.389	591	724	472	0.652	27.5	C+	475 ft
LT	12/1	0.152	0.078	1	119	94	0.681	53.3	*D	121 ft
NB Approach								44.2	D+	
TH	12/1	0.532	0.511	846	952	889	0.934	41.5	*D+	1028 ft
LT	12/1	0.254	0.200	203	349	300	0.847	52.1	*D	376 ft
WB Approach								46.6	D	
TH+LT	12/1	0.282	0.244	195	298	244	0.805	46.6	*D	295 ft
EB Approach								28.9	C	
TH+LT	12/1	0.179	0.244	307	450	173	0.384	28.9	C	169 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
AM Peak Hour of Traffic

04/27/04
11:50:30

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	425	85	170	100	120	135	800	270	440	150	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1239	0	0	1863	1770	0	1840	0

Phasing Parameters

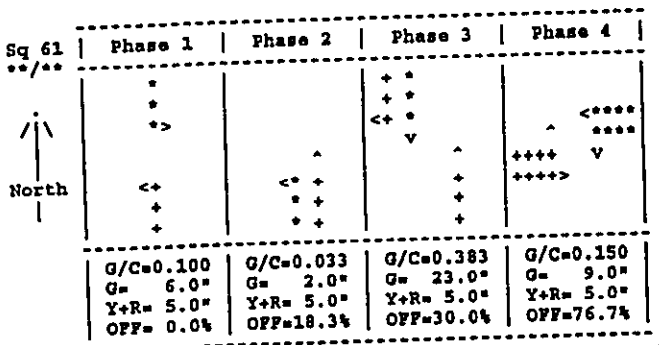
SEQUENCES	61	61			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	90	90				
GREENTIMES	7.00	6.00	35.00	22.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	8	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
PM Peak Hour of Traffic

04/27/04
11:51:57

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.60 Vehicle Delay 20.0 Level of Service B



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								20.5	C+	
SB Approach										
RT	12/1	0.027	0.383	529	607	6	0.010	12.9	B+	4 ft
TH	12/1	0.298	0.383	648	714	483	0.676	19.9	*B	343 ft
LT	12/1	0.060	0.100	118	169	61	0.345	26.3	*C+	48 ft
								18.5	B	
NB Approach										
TH	12/1	0.328	0.500	879	931	539	0.579	14.0	B+	343 ft
LT	12/1	0.191	0.217	311	383	267	0.697	27.5	*C	213 ft
								25.6	C+	
WB Approach										
TH+LT	12/1	0.116	0.150	163	222	117	0.518	25.6	*C+	91 ft
								23.2	C+	
EB Approach										
TH+LT	12/1	0.071	0.150	202	271	78	0.288	23.2	C+	56 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
PM Peak Hour of Traffic

04/27/04
11:52:04

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters												
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	435	55	80	55	50	35	485	240	250	65	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1509	0	0	1863	1770	0	1806	0

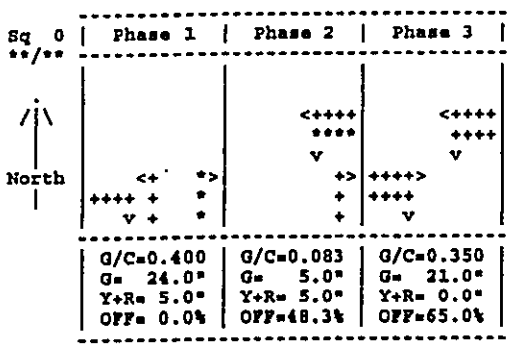
Phasing Parameters							
SEQUENCES	61	61					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	6.00	2.00	23.00	9.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	2	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:29:30

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.56 Vehicle Delay 18.2 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								25.4	C+	
RT	12/1	0.226	0.567	866	897	267	0.298	7.6	*A	121 ft
LT	12/1	0.395	0.400	655	708	644	0.910	32.8	C	540 ft
WB Approach								13.6	B+	
TH	12/1	0.163	0.433	759	807	233	0.289	11.2	B+	120 ft
LT	12/1	0.002	0.083	499	548	344	0.628	15.2	*B	220 ft
EB Approach								6.6	A	
RT	12/1	0.216	0.750	1188	1188	250	0.210	2.6	A	71 ft
TH	12/1	0.080	0.267	427	497	94	0.189	17.2	B	58 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:29:37

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	210	310	240	0	580	225	85	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:29:37

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

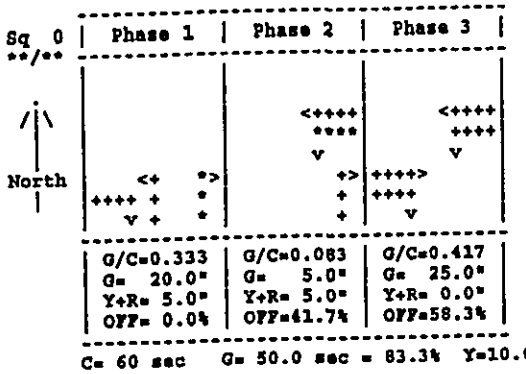
Phasing Parameters									
SEQUENCES	0	0				LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES		OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES		PEDTIME	0.0	0
CYCLES	60	120	10					
GREENTIMES	24.00	5.00	21.00					
YELLOWTIMES	5.00	5.00	0.00					
CRITICALS	7	6	2					
EXCESS	0							
PHASEMOVEMENTS	1	7	9	10	0	0	0	
PHASEMOVEMENTS	2	6	7	5	0	0	0	
PHASEMOVEMENTS	3	5	10	11	-6	0	0	
PHASEMOVEMENTS	4	0	0	0	0	0	0	
PHASEMOVEMENTS	5	0	0	0	0	0	0	
PHASEMOVEMENTS	6	0	0	0	0	0	0	

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:30:59

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.48 Vehicle Delay 11.3 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @X	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								14.3	B+	
RT	12/1	0.291	0.500	748	792	378	0.477	11.9	*B+	205 ft
LT	12/1	0.220	0.333	528	590	317	0.537	17.2	B	206 ft
WB Approach								13.2	B+	
TH	12/1	0.105	0.500	895	931	133	0.143	8.1	A	57 ft
LT	12/1	0.019	0.083	497	540	372	0.689	15.1	*B	238 ft
EB Approach								7.1	A	
RT	12/1	0.373	0.750	1188	1188	522	0.439	4.0	A	174 ft
TH	12/1	0.145	0.333	558	621	200	0.322	15.2	B	119 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	120	335	340	0	285	470	180	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
PM Peak Hour of Traffic 13:31:06
Base Year 2007 excluding other developments

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

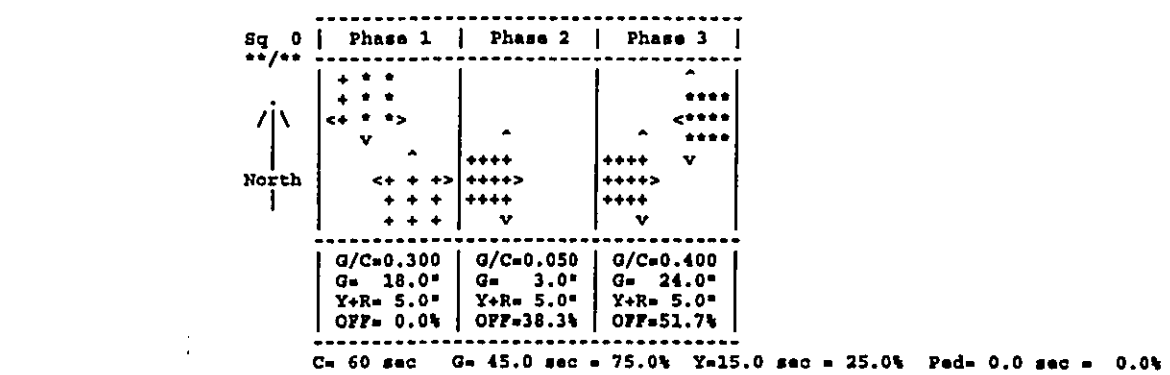
Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	20.00	5.00	25.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
AM Peak Hour of Traffic 13:27:24
Base Year 2007 excluding other developments

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.53 Vehicle Delay 16.1 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								19.8	B	
RT	12/1	0.212	0.300	395	475	244	0.514	21.3	C+	170 ft
TH+LT	12/1	0.127	0.300	316	376	105	0.279	16.5	*B	65 ft
NB Approach								21.8	C+	
RT+TH+LT	12/1	0.242	0.300	427	492	328	0.667	21.8	C+	236 ft
WB Approach								17.3	B	
RT+TH+LT	12/1	0.306	0.400	596	650	433	0.666	17.3	*B	286 ft
EB Approach								8.5	A	
RT+TH	12/1	0.263	0.533	956	986	416	0.422	8.7	A	198 ft
LT	12/1	0.060	0.533	913	944	61	0.065	6.8	A	24 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
AM Peak Hour of Traffic 13:27:31
Base Year 2007 excluding other developments

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD											
SIMULATION PERIOD	15											
LEVELOFSERVICE	C	S										
NODELOCATION	0	0										
QUEUEMODELS	1	90	25	40								

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	220	40	55	65	270	55	185	80	30	20	355	55
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1252	0	0	1626	0	0	1641	0	0	1848	1770

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:27:31

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

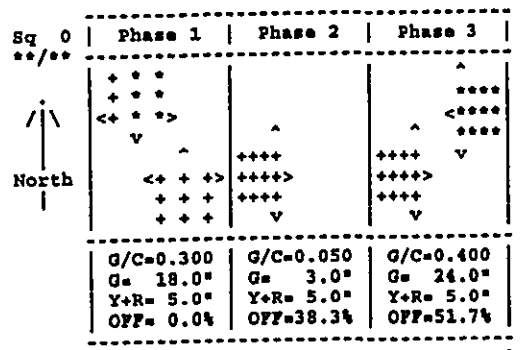
Phasing Parameters									
SEQUENCES	0	0							
PERMISSIVES	NO	NO		NO		NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES		YES		YES		OFFSET	0.00	1
CYCLES	60	120		10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00		24.00						
YELLOWTIMES	5.00	5.00		5.00						
CRITICALS	2	6		5						
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:28:43

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.43 Vehicle Delay 14.2 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								22.7	C+	
RT	12/1	0.252	0.300	395	475	311	0.655	25.2	C+	230 ft
TH+LT	12/1	0.112	0.300	405	469	117	0.249	16.2	*B	71 ft
NB Approach								16.1	B	
RT+TH+LT	12/1	0.111	0.300	444	509	127	0.250	16.1	B	77 ft
WB Approach								14.1	B+	
RT+TH+LT	12/1	0.243	0.400	616	670	338	0.504	14.1	*B+	203 ft
EB Approach								8.2	A	
RT+TH	12/1	0.206	0.533	947	977	305	0.312	8.0	A	136 ft
LT	12/1	0.238	0.533	913	944	350	0.371	8.4	A	162 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	280	60	45	65	200	40	30	65	20	30	245	315
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1563	0	0	1675	0	0	1695	0	0	1833	1770

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 excluding other developments

04/27/04
13:28:51

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0						LEADLAGS	NONE NONE
PERMISSIVES	NO	NO	NO	NO				OFFSET	0.00 .1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0 0
CYCLES	60	120	10						
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	MN		Jurisdiction/Date	KULA, MAUI	4/27/2004
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	AM PEAK	2007	Minor Street	KING KEKAULIKE SCHOOL	
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPM				

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			R			LTR			R		
Lane 2	L			LT						LT		
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)	230	720	5	5	1055	135	5	0	5	20	0	125
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	256	800	6	6	1172	150	6	0	6	22	0	139
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
EB	1	LTR	13	8	1.711	3	1263.2	F	1263.2 F
	2								
	3								
WB	1	R	150	233	.644	4	44.7	E	176.6 F
	2	LT	22	12	1.905	4	1076.2	F	
	3								
		①	256	519	.492	3	18.5	C	
		④	6	815	.007	<1	9.4	A	

HICAP 2000 TM
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1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	MN		Jurisdiction/Date	KULA, MAUI	4/27/2004
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	PM PEAK	2007	Minor Street	KING KEKAULIKE SCHOOL	
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME				

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			R			LTR			R		
Lane 2	L			LT						LT		
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)	20	720	5	5	720	5	5	0	5	10	0	30
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	22	800	6	6	800	6	6	0	6	11	0	33
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
EB	1	LTR	12	113	.106	<1	40.5	E	40.5 E
	2								
	3								
WB	1	R	33	383	.086	<1	15.3	C	27 D
	2	LT	11	74	.149	<1	62.3	F	
	3								
		①	22	815	.027	<1	9.5	A	
		④	6	815	.007	<1	9.4	A	

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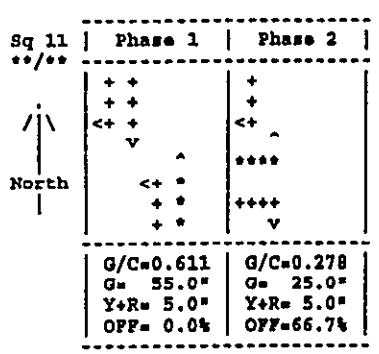
1 of 1

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
Base Year 2007 excluding other developments 11:33:41
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.61 Vehicle Delay 18.6 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								8.2	A	
RT	12/1	0.319	1.000	1583	1583	333	0.210	0.3	A	21 ft
TH	12/1	0.344	0.611	1055	1138	500	0.439	13.5	B+	400 ft
NB Approach								22.1	C+	
TH	12/1	0.569	0.611	1097	1138	1006	0.884	23.3	*C+	984 ft
LT	12/1	0.233	0.611	370	416	89	0.214	8.1	A	50 ft
EB Approach								31.0	C	
RT	12/1	0.169	0.278	276	440	72	0.164	25.4	C+	70 ft
LT	12/1	0.262	0.278	360	492	328	0.667	32.2	*C	343 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
Base Year 2007 excluding other developments 11:37:35
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	300	450	0	0	0	0	0	905	80	65	0	295
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	680	1583	0	1770

Phasing Parameters

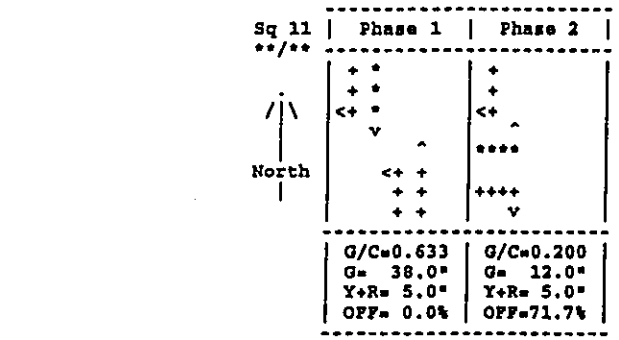
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	90	10		PEDTIME	0.0	0
GREENTIMES	55.00	25.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
PM Peak Hour of Traffic

04/27/04
11:40:31

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.52 Vehicle Delay 9.7 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								9.2	A	
RT	12/1	0.115	1.000	1583	1583	94	0.059	0.1	A	4 ft
TH	12/1	0.413	0.633	1147	1180	706	0.598	10.4	*B+	415 ft
NB Approach								6.6	A	
TH	12/1	0.374	0.633	1171	1180	639	0.542	6.7	A	283 ft
LT	12/1	0.000	0.633	270	303	17	0.056	4.3	A	6 ft
EB Approach								22.0	C+	
RT	12/1	0.059	0.200	225	317	28	0.088	20.1	C+	21 ft
LT	12/1	0.135	0.200	283	354	172	0.486	22.3	*C+	124 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 excluding other developments
PM Peak Hour of Traffic

04/27/04
11:40:44

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	635	0	0	0	0	0	575	15	25	0	155
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	.0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	478	1583	0	1770

Phasing Parameters

SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	38.00	12.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	12					
EXCESS	0						

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	OMAOPIO RD
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			LTR			LTR		
Lane 2												
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)	50	390	35	25	590	5	35	10	20	5	25	220
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	56	433	39	28	656	6	39	11	22	6	28	244
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
EB	1	LTR	72	69	1.042	5	223	F	223
	2								F
	3								
WB	1	LTR	278	358	.777	6	42.6	E	42.6
	2								E
	3								
		①	56	923	.06	<1	9.2	A	
		④	28	1084	.026	<1	8.4	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	OMAOPIO RD
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			LTR			LTR		
Lane 2												
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)	115	435	35	20	430	5	30	15	10	5	15	85
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	128	483	39	22	478	6	33	17	11	6	17	94
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
EB	1	LTR	61	113	.541	3	69.5	F	69.5
	2								F
	3								
WB	1	LTR	117	335	.349	2	21.4	C	21.4
	2								C
	3								
		①	128	1074	.119	<1	8.8	A	
		④	22	1039	.021	<1	8.5	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	KEKAULIKE AVE
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						LR	
Lane 2												
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)	50	190			265	15				25		85
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	211			294	17				28		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
EB	1								
	2								
	3								
WB	1	LR	122	629	.194	1	12.1	B	12.1
	2								B
	3								
		①	56	1244	.045	<1	8	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	KEKAULIKE AVE
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						LR	
Lane 2												
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)	55	190			260	20				20		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	211			289	22				22		39
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	LR	61	578	.106	<1	12	B	12
	2								B
	3								
		①	61	1244	.049	<1	8	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	PUEO DR
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		180	20	5	210		25		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		200	22	6	233		28		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
EB	1	LR	34	592	.057	<1	11.4	B	11.4
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1341	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	PUEO DR
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		180	25	5	240		10		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		200	28	6	267		11		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
EB	1	LR	17	608	.028	<1	11.1	B	11.1
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1335	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	LAUIE DR
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		150	40	5	165		45		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		167	44	6	183		50		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
EB	1	LR	56	633	.088	<1	11.2	B	11.2
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1353	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	LAUIE DR
Comment	BASE YEAR 2007 EXCL OTHER DEVELOPME		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		125	50	5	215		35		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		139	56	6	239		39		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
EB	1	LR	45	615	.073	<1	11.3	B	11.3
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1373	.004	<1	7.6	A	

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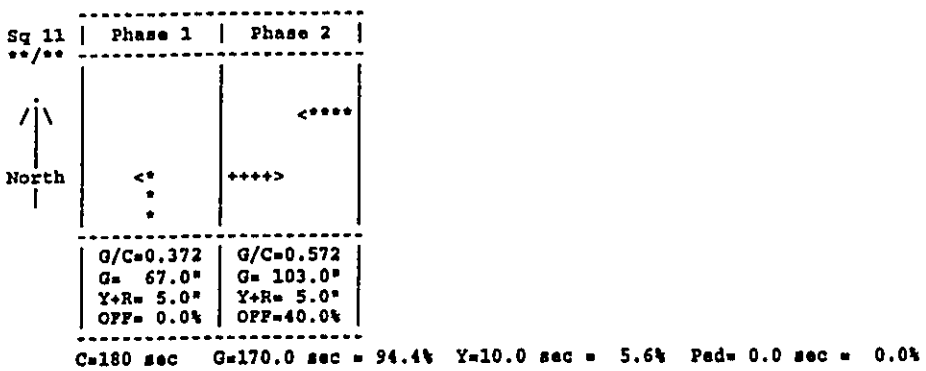
APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Base Year 2007 Scenario A,
  With Mitigative Measures

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
AM Peak Hour of Traffic 10:27:47
Base Year 2007 excluding other developments, with traffic sig

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 1.23 Vehicle Delay 198.2 Level of Service F



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								234.7	F	
LT	12/1	0.606	0.372	1	631	906	1.375	234.7	*F	2811 ft
WB Approach								215.8	F	
TH	12/1	0.806	0.572	856	1066	1472	1.381	215.8	*F	4537 ft
EB Approach								18.2	B	
TH	24/2	0.407	0.572	1700	2025	328	0.162	18.2	B	187 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
AM Peak Hour of Traffic 10:28:08
Base Year 2007 excluding other developments, with traffic sig

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

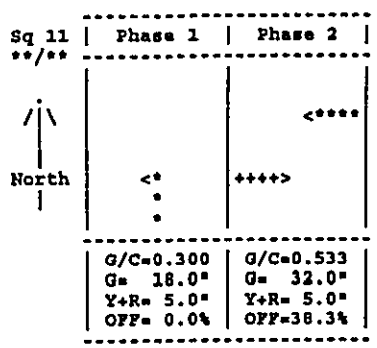
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	1325	0	5	0	815	250	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	67.00	103.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.56 Vehicle Delay 11.9 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								11.8	B+	
TH	12/1	0.385	0.533	963	993	661	0.666	11.8	*B+	378 ft
EB Approach								8.8	A	
TH	24/2	0.265	0.533	1888	1888	861	0.456	8.8	A	221 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	595	0	5	0	295	645	775	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

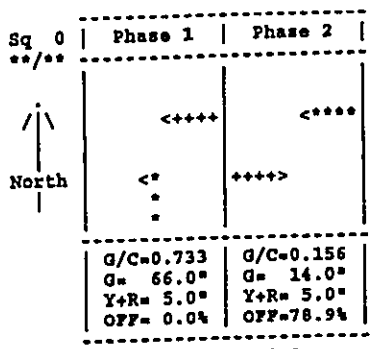
SEQUENCES	11	11				
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	60		PEDTIME	0.0 0
GREENTIMES	18.00	32.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	9	5				
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments, with traffic sig

04/29/04
10:31:06

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.74 Vehicle Delay 8.6 Level of Service A



Cs 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@X	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								8.2	A	
LT	12/1	0.546	0.733	1289	1298	906	0.698	8.2	*A	573 ft
WB Approach								2.4	A	
TH	12/1	0.785	1.000	1863	1863	1472	0.790	2.4	*A	155 ft
EB Approach								37.1	D+	
TH	24/2	0.172	0.156	242	551	328	0.595	37.1	D+	195 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 excluding other developments, with traffic sig

04/29/04
10:31:12

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1325	0	5	0	815	250	295	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	595	0	5	0	295	645	775	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 excluding other developments, with traffic sig
04/29/04
10:42:43

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES		LEADLAGS	NONE	NONE	
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1	
CYCLES	60	180	10			PEDTIME	0.0	0	
GREENTIMES	18.00	32.00							
YELLOWTIMES	5.00	5.00							
CRITICALS	9	5							
EXCESS	0								
PHASEMOVEMENTS	1	9	5	0	0	0	0		
PHASEMOVEMENTS	2	5	11	0	0	0	0		
PHASEMOVEMENTS	3	0	0	0	0	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
AM Peak Hour of Traffic 10:31:12
Base Year 2007 excluding other developments, with traffic sig

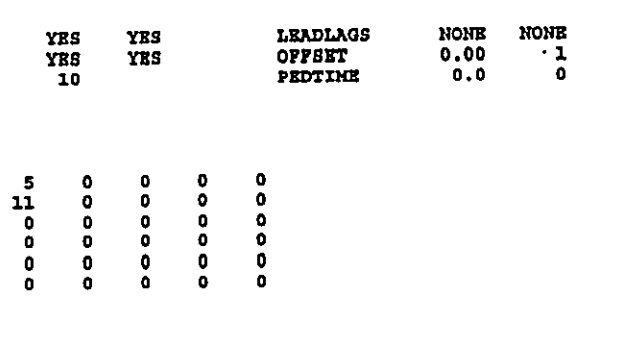
SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Paramater Values

Phasing Parameters										
SEQUENCES	0	0								
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	180	10					PEDTIME	0.0	0
GREENTIMES	66.00	14.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
PM Peak Hour of Traffic 10:42:36
Base Year 2007 excluding other developments, with traffic sig

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.45 Vehicle Delay 7.7 Level of Service A



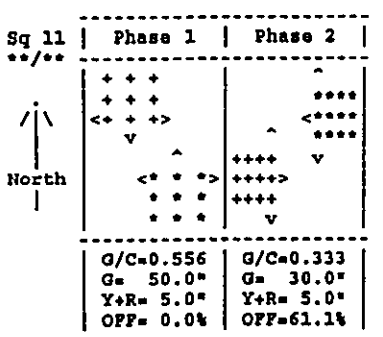
C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								0.1	A	
TH	12/1	0.385	1.000	1863	1863	661	0.355	0.1	*A	20 ft
EB Approach								8.8	A	
TH	24/2	0.265	0.533	1888	1888	861	0.456	8.8	A	221 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
Base Year 2007 excluding other developments, with traffic sig 10:12:46
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.60 Vehicle Delay 18.8 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								18.3	B	
RT+TH+LT	12/1	0.399	0.556	813	906	528	0.583	18.3	B	472 ft
NB Approach								16.4	B	
RT+TH+LT	12/1	0.434	0.556	944	1001	690	0.689	16.4	*B	563 ft
WB Approach								24.9	C+	
RT+TH+LT	12/1	0.250	0.333	432	545	278	0.510	24.9	*C+	261 ft
EB Approach								21.2	C+	
RT+TH+LT	12/1	0.153	0.333	362	466	72	0.155	21.2	C+	60 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/29/04
Base Year 2007 excluding other developments, with traffic sig 10:13:02
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

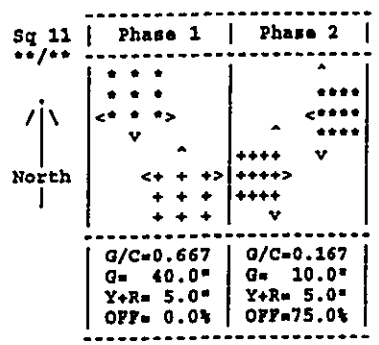
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	35	390	50	220	25	5	5	590	25	20	10	35
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
LANES	0	1	0	0	1	0	0	1	0	0	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1630	0	0	1635	0	0	1802	0	0	1397	0

Phasing Parameters

SEQUENCES	11	11						
PERMISSIVES	NO	NO	NO	NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1
CYCLES	90	180	90			PEDTIME	0.0	0
GREENTIMES	50.00	30.00						
YELLOWTIMES	5.00	5.00						
CRITICALS	8	5						
EXCESS	0							

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.52 Vehicle Delay 10.0 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								10.5	B+	
RT+TH+LT	12/1	0.467	0.667	976	1010	650	0.644	10.5	*B+	392 ft
NB Approach								4.9	A	
RT+TH+LT	12/1	0.317	0.667	1195	1199	506	0.422	4.9	A	189 ft
WB Approach								23.5	C+	
RT+TH+LT	12/1	0.107	0.167	205	272	117	0.430	23.5	*C+	86 ft
EB Approach								22.3	C+	
RT+TH+LT	12/1	0.071	0.167	182	243	61	0.249	22.3	C+	43 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	SB			WB			NB			EB		
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	35	435	115	85	15	5	5	430	20	10	15	30
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
LANES	0	1	0	0	1	0	0	1	0	0	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1516	0	0	1634	0	0	1798	0	0	1471	0

Phasing Parameters

SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	40.00	10.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	5					
EXCESS	0						

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
CIVIL ENGINEERS • SURVEYORS

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Base Year 2007 Scenario B

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: TL
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: HALEAKALA HWY
Minor Street: OLD HALEAKALA HWY

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	T	T	R	
Lane 2	T		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)		395			0		850		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		439			0		944		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	R	6	782	.008	<1	9.6	A	355.6
	2	L	944	544	1.736	56	357.8	F	F
	3								
SB	1								
	2								
	3								
		①							
		④							

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: HALEAKALA HWY
Minor Street: OLD HALEAKALA HWY

Input Data

Lane Configuration	EB	WB	NB	SB
Lane 1 (curb)	T	T	R	
Lane 2	T		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)		1085			0		385		5			
PHF		.9			.9		.9		.9			
Proportion of heavy vehicles, HV		3			3		3		3			
Flow rate		1206			0		428		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	R	6	440	.014	<1	13.3	B	700.9
	2	L	428	175	2.449	36	710.6	F	F
	3								
SB	1								
	2								
	3								
		①							
		④							

1 of 1

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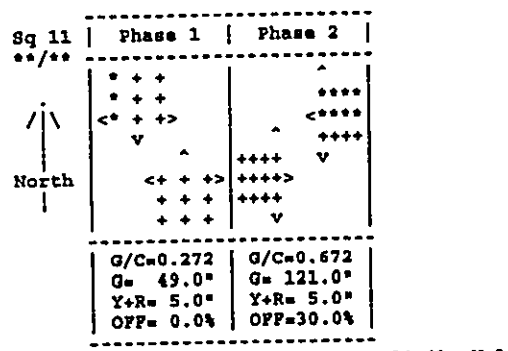
Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
AM Peak Hour of Traffic

04/26/04
11:09:28

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.73 Vehicle Delay 56.9 Level of Service E+



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								83.9	F	
RT	12/1	0.483	0.272	1	365	406	0.942	95.1	*F	977 ft
TH+LT	12/1	0.445	0.272	1	305	256	0.717	66.0	E+	524 ft
NB Approach								51.9	D	
RT	12/1	0.403	0.272	1	365	106	0.246	52.4	D	193 ft
TH+LT	12/1	0.399	0.272	1	417	117	0.247	51.4	D	208 ft
WB Approach								55.8	E+	
RT+TH	12/1	0.745	0.672	968	1243	1178	0.948	56.5	*E+	2350 ft
LT	12/1	0.429	0.672	463	620	22	0.035	15.5	B	29 ft
EB Approach								22.8	C+	
RT+TH	24/2	0.415	0.672	2239	2374	412	0.174	11.0	B+	186 ft
LT	12/1	0.901	0.672	24	32	39	0.951	148.1	F	112 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
AM Peak Hour of Traffic

04/26/04
11:09:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	365	105	125	50	1010	20	95	90	15	5	365	35
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1310	0	0	1849	927	1583	1738	0	0	3531	62

Phasing Parameters

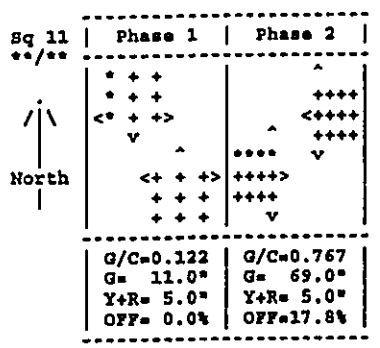
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	180	180	90		PEDTIME	0.0	0
GREENTIMES	49.00	121.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	1	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
11:11:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.51 Vehicle Delay 11.6 Level of Service B+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								41.6	D+	
RT	12/1	0.182	0.122	5	173	94	0.485	45.3	*D	115 ft
TH+LT	12/1	0.148	0.122	12	201	83	0.382	37.5	D+	93 ft
NB Approach								37.7	D+	
RT	12/1	0.141	0.122	5	173	28	0.144	36.9	D+	34 ft
TH+LT	12/1	0.151	0.122	12	207	95	0.426	37.9	D+	107 ft
WB Approach								10.6	B+	
RT+TH	12/1	0.558	0.767	1374	1421	939	0.661	10.8	B+	710 ft
LT	12/1	0.190	0.767	339	385	39	0.101	5.3	A	25 ft
EB Approach								5.2	A	
RT+TH	24/2	0.330	0.767	2709	2709	1005	0.371	3.5	A	209 ft
LT	12/1	0.657	0.767	225	256	183	0.715	14.6	*B+	135 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
11:12:07

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	65	10	30	815	35	25	80	5	10	895	165
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1772	0	0	1853	502	1583	1825	0	0	3533	334

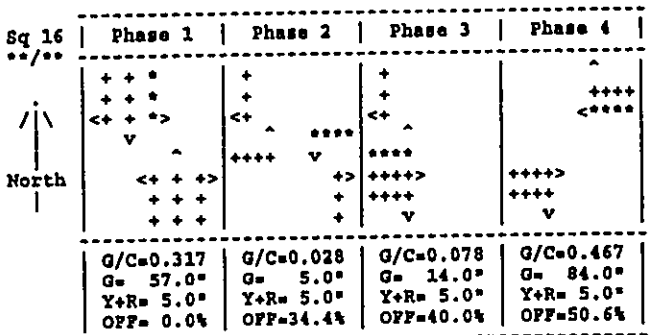
Phasing Parameters

SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	11.00	69.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	1	12					
EXCESS	0						

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.65 Vehicle Delay 64.6 Level of Service E+

Sq 16 **/**



C=180 sec G=160.0 sec = 88.9% Y=20.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								63.5	E+	
RT	12/1	0.456	0.478	388	756	311	0.411	32.2	C	438 ft
TH	12/1	0.443	0.317	1	546	361	0.612	54.0	D	656 ft
LT	12/1	0.497	0.317	1	311	344	0.975	101.7	*F	831 ft
NB Approach								45.2	D	
RT	12/1	0.379	0.372	1	556	11	0.019	35.8	D+	18 ft
TH	12/1	0.402	0.317	1	546	144	0.244	45.8	D	240 ft
LT	12/1	0.402	0.317	1	143	39	0.222	45.8	D	69 ft
WB Approach								69.3	E	
RT	12/1	0.509	0.467	165	709	306	0.414	39.8	D+	511 ft
TH	12/1	0.630	0.467	219	845	844	0.971	79.9	*E	1823 ft
LT	12/1	0.421	0.028	1	1	6	0.122	86.5	*F	14 ft
EB Approach								63.5	E+	
RT	12/1	0.440	0.572	506	902	72	0.079	23.4	C+	112 ft
TH	24/2	0.457	0.572	1261	2025	339	0.167	24.5	C+	262 ft
LT	12/1	0.473	0.133	1	153	233	0.987	132.7	*F	604 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	280	325	310	275	760	5	10	130	35	65	305	210
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1115	1583	1863	1770	1583	1863	555	1583	3539	1770

Phasing Parameters

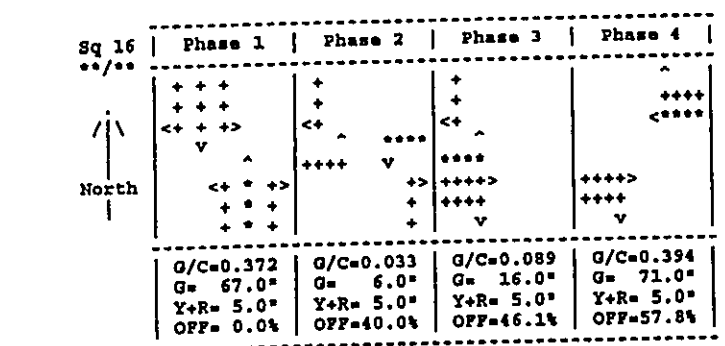
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	180	180	10		PEDTIME	0.0	0
GREENTIMES	57.00	5.00	14.00	84.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	6	12	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
13:03:12

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Avon
Degree of Saturation (v/c) 0.78 Vehicle Delay 118.8 Level of Service F



C=180 sec G=160.0 sec = 88.9% Y=20.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								334.3	F	
RT	12/1	0.419	0.550	623	871	172	0.197	21.0	C+	204 ft
TH	12/1	0.446	0.372	1	666	378	0.545	45.4	D	635 ft
LT	12/1	1.000	0.372	1	39	189	3.436	1197.2	F	1008 ft
NB Approach								63.6	E+	
RT	12/1	0.382	0.433	227	673	22	0.032	29.4	C	33 ft
TH	12/1	0.504	0.372	1	666	622	0.898	67.8	*E	1270 ft
LT	12/1	0.428	0.372	1	203	89	0.382	42.4	D+	155 ft
WB Approach								68.7	E	
RT	12/1	0.507	0.394	1	577	300	0.480	48.7	D	537 ft
TH	12/1	0.582	0.394	1	694	683	0.929	77.2	*E	1446 ft
LT	12/1	0.422	0.033	1	1	11	0.186	86.2	*F	26 ft
EB Approach								50.9	D	
RT	12/1	0.481	0.511	313	790	211	0.261	31.9	C	331 ft
TH	24/2	0.483	0.511	798	1809	561	0.310	32.2	C	467 ft
LT	12/1	0.475	0.150	1	184	244	0.921	110.4	*F	596 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
13:03:19

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters -

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	155	340	170	270	615	10	20	560	80	190	505	220
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIHUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	147	1583	1863	1770	1583	1863	627	1583	3539	1770

Phasing Parameters

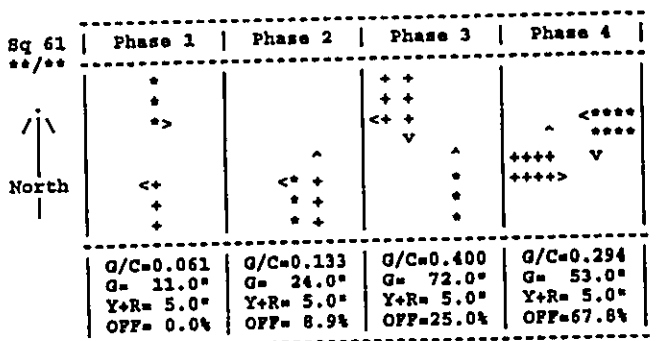
SEQUENCES	16	16			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	60	180	10				
GREENTIMES	67.00	6.00	16.00	71.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	8	6	12	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
AM Peak Hour of Traffic

04/26/04
13:19:21

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.85 Vehicle Delay 71.9 Level of Service E



C=180 sec G=160.0 sec = 88.9% Y=20.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								72.9	E	
RT	12/1	0.421	0.400	1	586	6	0.009	37.0	D+	12 ft
TH	12/1	0.559	0.400	1	705	600	0.805	60.8	E+	1169 ft
LT	12/1	0.442	0.061	1	9	100	0.926	147.6	*F	274 ft
NB Approach								71.0	E	
TH	12/1	0.668	0.561	609	1045	961	0.920	60.3	*E+	1919 ft
LT	12/1	0.505	0.222	1	320	367	0.934	99.2	*F	853 ft
WB Approach								86.6	F	
TH+LT	12/1	0.475	0.294	1	294	306	0.900	86.6	*F	698 ft
EB Approach								50.0	D	
TH+LT	12/1	0.409	0.294	1	492	178	0.328	50.0	D	310 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
AM Peak Hour of Traffic

04/26/04
13:19:36

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	5	540	90	170	125	150	155	865	330	560	155	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1156	0	0	1863	1770	0	1840	0

Phasing Parameters

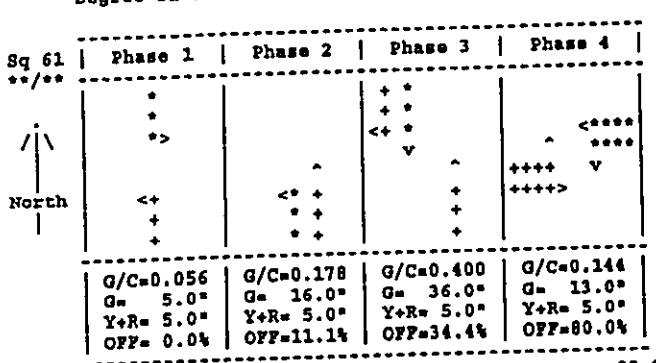
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	180	180	90		PEDTIME	0.0 0
GREENTIMES	11.00	24.00	72.00	53.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	8	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
13:20:57

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.87 Vehicle Delay 47.6 Level of Service D



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Peds 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								61.5	E+	
RT	12/1	0.123	0.400	484	633	6	0.009	18.5	B	6 ft
TH	12/1	0.460	0.400	615	745	739	0.992	61.4	*E+	971 ft
LT	12/1	0.144	0.056	1	80	72	0.735	66.5	*E+	98 ft
NB Approach								38.8	D+	
TH	12/1	0.553	0.633	1102	1180	933	0.791	21.5	C+	884 ft
LT	12/1	0.362	0.289	366	511	506	0.990	70.8	*E	702 ft
WB Approach								61.4	E+	
TH+LT	12/1	0.207	0.144	57	192	172	0.831	61.4	*E+	226 ft
EB Approach								36.0	D+	
TH+LT	12/1	0.154	0.144	77	251	106	0.402	36.0	D+	116 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
13:21:04

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	5	665	65	80	80	75	65	840	455	425	90	5
VOLUMES	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
WIDTHS	1	1	1	1	1	0	1	1	1	1	1	0
LANES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	2	2	2	3	3	3	2	2	2	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1583	1863	1770	0	1432	0	0	1863	1770	0	1831	0
SATURATIONFLOWS												

Phasing Parameters

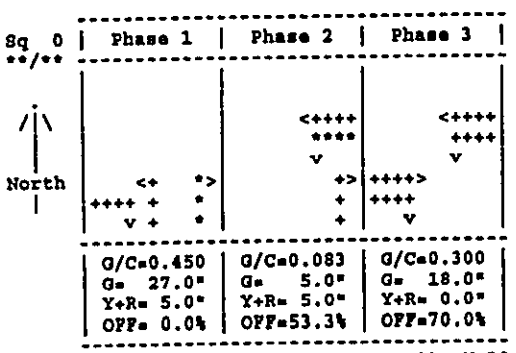
SEQUENCES	61	61			LEADLAGS	NONE NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00 1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0 0
CYCLES	90	180	90			
GREENTIMES	5.00	16.00	36.00	13.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:25:38

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.58 Vehicle Delay 17.5 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								15.5	B	
RT	12/1	0.291	0.617	955	976	378	0.387	7.0	*A	163 ft
LT	12/1	0.395	0.450	750	796	644	0.809	20.5	C+	458 ft
WB Approach								25.7	C+	
TH	12/1	0.185	0.383	658	714	272	0.381	13.7	B+	156 ft
LT	12/1	0.082	0.083	386	439	383	0.872	34.3	*C	326 ft
EB Approach								9.0	A	
RT	12/1	0.216	0.750	1188	1188	250	0.210	2.6	A	71 ft
TH	12/1	0.109	0.217	332	404	139	0.344	20.4	C+	95 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:25:44

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	245	345	340	0	580	225	125	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:25:44

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

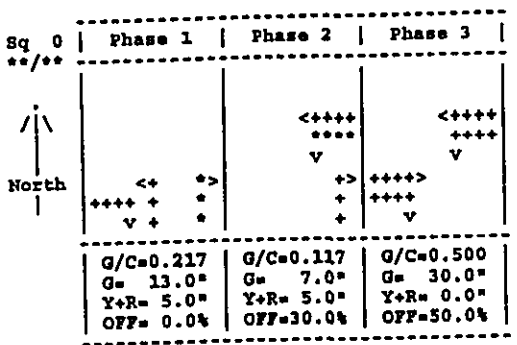
Phasing Parameters									
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	27.00	5.00	18.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007

04/26/04
13:27:07

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.66 Vehicle Delay 22.3 Level of Service C+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								27.4	C+	
RT	12/1	0.348	0.417	600	660	478	0.724	21.4	*C+	333 ft
LT	12/1	0.220	0.217	312	383	317	0.828	36.4	D+	270 ft
WB Approach								31.1	C	
TH	12/1	0.163	0.617	1136	1149	233	0.203	5.1	A	83 ft
LT	12/1	0.124	0.117	618	647	633	0.978	40.6	*D+	608 ft
EB Approach								7.4	A	
RT	12/1	0.373	0.717	1135	1135	522	0.460	4.9	A	193 ft
TH	12/1	0.182	0.417	725	776	267	0.344	12.2	B+	144 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	210	570	430	0	285	470	240	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007

04/26/04
13:27:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

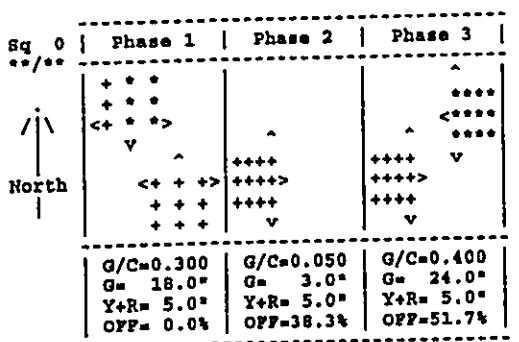
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	13.00	7.00	30.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:22:42

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.62 Vehicle Delay 18.2 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								20.5	C+	
RT	12/1	0.222	0.300	395	475	261	0.549	22.1	C+	184 ft
TH+LT	12/1	0.134	0.300	295	354	105	0.297	16.6	*B	66 ft
NB Approach								25.0	C+	
RT+TH+LT	12/1	0.265	0.300	427	492	366	0.744	25.0	C+	276 ft
WB Approach								22.6	C+	
RT+TH+LT	12/1	0.355	0.400	584	638	506	0.793	22.6	*C+	372 ft
EB Approach								9.4	A	
RT+TH	12/1	0.326	0.533	957	987	539	0.546	9.9	A	280 ft
LT	12/1	0.084	0.533	913	944	94	0.100	6.9	A	37 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:22:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	235	40	55	70	325	60	220	80	30	20	465	85
VOLUMES	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
WIDTHS	1	1	0	0	1	0	0	1	0	0	1	1
LANES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	3	3	3	3	3	3	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1583	1179	0	0	1594	0	0	1638	0	0	1851	1770
SATURATIONFLOWS												

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007

04/26/04
13:22:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

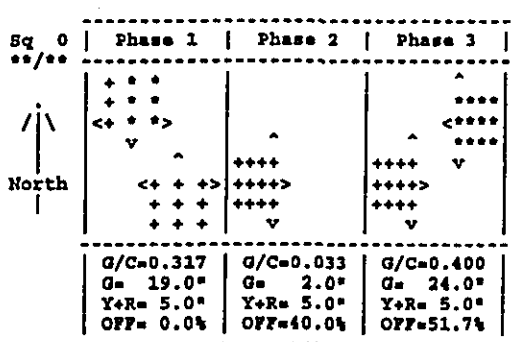
Phasing Parameters									
SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	120	10				PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007

04/26/04
13:24:49

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.63 Vehicle Delay 22.0 Level of Service C+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Pad= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								28.2	C	
RT	12/1	0.307	0.317	423	501	406	0.810	32.1	C	330 ft
TH+LT	12/1	0.124	0.317	418	480	128	0.267	15.6	*B	77 ft
NB Approach								15.5	B	
RT+TH+LT	12/1	0.115	0.317	471	535	133	0.249	15.5	B	79 ft
WB Approach								34.8	C	
RT+TH+LT	12/1	0.400	0.400	624	678	623	0.919	34.8	*C	534 ft
EB Approach								9.4	A	
RT+TH	12/1	0.281	0.517	919	952	450	0.473	9.6	A	227 ft
LT	12/1	0.250	0.517	880	914	372	0.407	9.2	A	181 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	365	60	55	70	440	50	35	65	20	30	375	335
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1517	0	0	1695	0	0	1691	0	0	1842	1770

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007

04/26/04
13:24:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	19.00	2.00	24.00							
YELLOWTIMES	5.00	5.00	5.00							
CRITICALS	2	6	5							
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/26/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	KING KEKAULIKE SCHOOL
Comment	BASE YEAR 2007		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	L	LT		LT
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)	230	980	5	5	1205	135	5	0	5	20	0	125
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	256	1089	6	6	1339	150	6	0	6	22	0	139
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
EB	1	LTR	13	2	6.502	3	5651.3	F	5651.3
	2								F
	3								
WB	1	R	150	186	.807	6	75.3	F	463
	2	LT	22	5	4.668	4	3106.4	F	F
	3								
		①	256	448	.57	3	23.2	C	
		④	6	634	.009	<1	10.7	B	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/26/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	KING KEKAULIKE SCHOOL
Comment	BASE YEAR 2007		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	L	LT		LT
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)	20	1155	5	5	1310	5	5	0	5	10	0	30
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	22	1283	6	6	1456	6	6	0	6	11	0	33
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

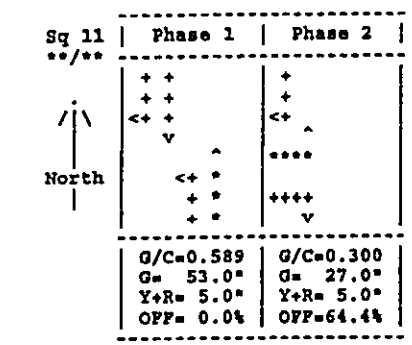
Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	LTR	12	16	.749	2	454.3	F	454.3
	2								F
	3								
WB	1	R	33	159	.208	1	33.6	D	213.9
	2	LT	11	11	1.041	2	754.7	F	F
	3								
		①	22	459	.048	<1	13.2	B	
		④	6	535	.01	<1	11.8	B	

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
Base Year 2007 08:36:44
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.68 Vehicle Delay 23.6 Level of Service C+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								7.4	A	
RT	12/1	0.463	1.000	1583	1583	600	0.379	0.7	A	46 ft
TH	12/1	0.358	0.589	1009	1097	528	0.481	14.9	B+	437 ft
NB Approach								32.0	C	
TH	12/1	0.590	0.589	1049	1097	1050	0.957	35.2	*D+	1199 ft
LT	12/1	0.360	0.589	321	369	161	0.436	11.1	B+	112 ft
EB Approach								38.8	D+	
RT	12/1	0.182	0.300	320	475	94	0.198	24.4	C+	89 ft
LT	12/1	0.322	0.300	405	531	450	0.847	41.8	*D+	519 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
Base Year 2007 08:38:17
AM Peak Hour of Traffic

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	540	475	0	0	0	0	0	945	145	85	0	405
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	626	1583	0	1770

Phasing Parameters

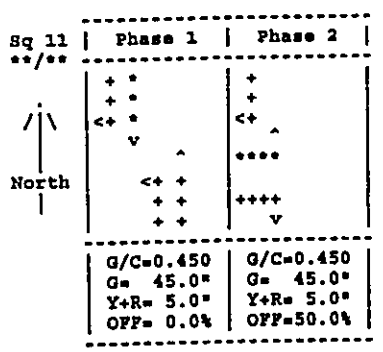
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	90	10		PEDTIME	0.0	0
GREENTIMES	53.00	27.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
08:40:19

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.81 Vehicle Delay 42.7 Level of Service D+



C=100 sec G= 90.0 sec = 90.0% Y=10.0 sec = 10.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								40.4	D+	
RT	12/1	0.401	1.000	1583	1583	450	0.284	0.5	A	33 ft
TH	12/1	0.517	0.450	689	838	833	0.994	61.9	*E+	1167 ft
NB Approach								35.5	D+	
TH	12/1	0.426	0.450	732	838	678	0.809	29.8	C	739 ft
LT	12/1	0.577	0.450	47	64	67	0.893	94.1	F	109 ft
EB Approach								51.7	D	
RT	12/1	0.224	0.450	593	713	117	0.164	16.8	B	98 ft
LT	12/1	0.496	0.450	692	796	789	0.991	56.9	*E+	1106 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007
PM Peak Hour of Traffic

04/26/04
08:40:29

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	405	750	0	0	0	0	0	610	60	105	0	710
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	166	1583	0	1770

Phasing Parameters

SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	100	100	10		PEDTIME	0.0 0
GREENTIMES	45.00	45.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	2	12				
EXCESS	0					

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	MN		Jurisdiction/Date	KULA, MAUI	4/26/2004
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	AM PEAK	2007	Minor Street	OMAOPIO RD	
Comment	BASE YEAR 2007				

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	LTR	LTR
Lane 2				
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)	50	430	40	25	655	5	40	10	20	5	25	245
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	56	478	44	28	728	6	44	11	22	6	28	272
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
EB	1	LTR	77	40	1.948	8	663.3	F	663.3 F
	2								
	3								
WB	1	LTR	279	316	.884	8	62.6	F	62.6 F
	2								
	3								
		①	56	867	.064	<1	9.4	A	
		④	28	1039	.027	<1	8.6	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information			Site Information		
Analyst	MN		Jurisdiction/Date	KULA, MAUI	4/26/2004
Agency or Company	ATA		Major Street	KULA HWY	
Analysis Period/Year	PM PEAK	2007	Minor Street	OMAOPIO RD	
Comment	BASE YEAR 2007				

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	LTR	LTR
Lane 2				
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)	160	575	50	20	495	5	30	15	10	5	15	95
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	178	639	56	22	550	6	33	17	11	6	17	106
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
EB	1	LTR	61	53	1.14	5	292.5	F	292.5 F
	2								
	3								
WB	1	LTR	118	216	.547	3	40.2	E	40.2 E
	2								
	3								
		①	178	1010	.176	1	9.3	A	
		④	22	896	.025	<1	9.1	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/26/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	KEKAULIKE AVE
Comment	BASE YEAR 2007		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	60	215			315	15				25		100
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	67	239			350	17				28		111
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	LR	139	580	.24	1	13.1	B	13.1
	2								B
	3								
		①	67	1186	.056	<1	8.2	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/26/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	KEKAULIKE AVE
Comment	BASE YEAR 2007		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	95	290			320	20				20		45
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	106	322			356	22				22		50
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	LR	72	467	.154	1	14.1	B	14.1
	2								B
	3								
		①	106	1175	.09	<1	8.4	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: KULA HWY
Minor Street: PUEO DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		205	20	5	260		25		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		228	22	6	289		28		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
EB	1	LR	34	535	.064	<1	12.2	B	12.2
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1310	.004	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: KULA HWY
Minor Street: PUEO DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		280	25	5	300		10		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		311	28	6	333		11		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
EB	1	LR	17	490	.035	<1	12.6	B	12.6
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1215	.005	<1	8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: KULA HWY
Minor Street: LAUIE DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		180	40	5	215		45		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		200	44	6	239		50		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
EB	1	LR	56	566	.099	<1	12.1	B	12.1 B
	2								
	3								
WB	1								
	2								
	3								
		①							
		④	6	1316	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2007
Comment: BASE YEAR 2007

Site Information

Jurisdiction/Date: KULA, MAUI 4/26/2004
Major Street: KULA HWY
Minor Street: LAUIE DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		225	50	5	275		35		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		250	56	6	306		39		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
EB	1	LR	45	489	.092	<1	13.1	B	13.1 B
	2								
	3								
WB	1								
	2								
	3								
		①							
		④	6	1250	.004	<1	7.9	A	

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APPENDIX C
LEVEL OF SERVICE CALCULATIONS

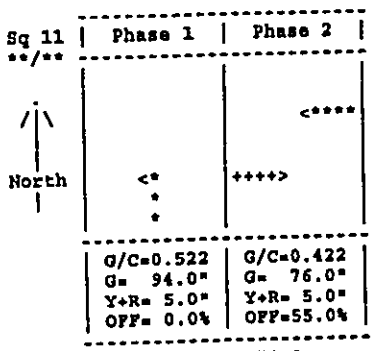
- Year 2007 Scenario B,
With Mitigative Measures

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with traffic signal and Halekala Highway widen

04/26/04
14:09:52

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.92 Vehicle Delay 78.6 Level of Service E



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								78.2	E	
LT	12/1	0.620	0.522	652	924	944	1.022	78.2	*E	2134 ft
WB Approach								91.5	F	
TH	24/2	0.613	0.422	26	1477	1539	1.030	91.5	*F	1870 ft
EB Approach								34.4	C	
TH	24/2	0.417	0.422	490	1494	439	0.294	34.4	C	337 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with traffic signal and Halekala Highway widen

04/26/04
14:10:02

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90	25 40		

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1385	0	5	0	850	295	395	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

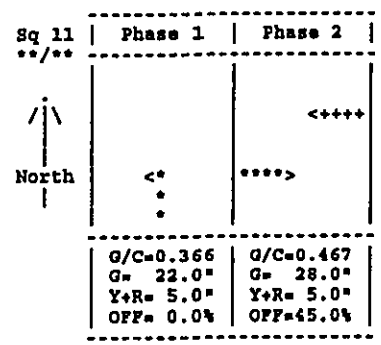
Phasing Parameters

SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	180	180	60				
GREENTIMES	94.00	76.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
PM Peak Hour of Traffic 14:12:32
Base Year 2007 with traffic signal and Halekala Highway widen

SIGNAL2000/TRAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.66 Vehicle Delay 15.2 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								18.4	B	
LT	12/1	0.281	0.366	591	649	428	0.659	18.4	*B	288 ft
WB Approach								14.6	B+	
TH	24/2	0.296	0.467	1609	1652	967	0.585	14.6	B+	331 ft
EB Approach								14.6	B+	
TH	24/2	0.356	0.467	1632	1652	1206	0.730	14.6	*B+	410 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
PM Peak Hour of Traffic 14:13:11
Base Year 2007 with traffic signal and Halekala Highway widen

SIGNAL2000/TRAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	870	0	5	0	385	705	1085	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

Phasing Parameters

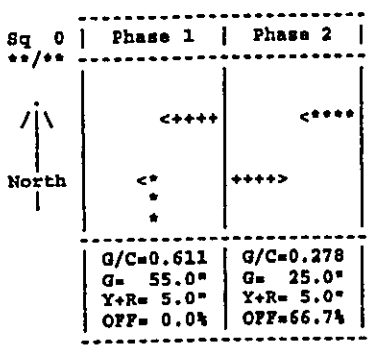
SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	21.99	28.01					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	11					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with traffic signal and Haleakala Highway wide

04/26/04
14:08:51

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.58 Vehicle Delay 11.4 Level of Service B+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								22.7	C+	
LT	12/1	0.565	0.611	1039	1081	944	0.873	22.7	*C+	913 ft
WB Approach								0.1	A	
TH	24/2	0.474	1.000	3539	3539	1539	0.435	0.1	*A	35 ft
EB Approach								27.1	C+	
TH	24/2	0.197	0.278	788	983	439	0.447	27.1	C+	222 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with traffic signal and Haleakala Highway wide

04/26/04
14:09:08

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	E		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1385	0	5	0	850	295	395	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
AM Peak Hour of Traffic 14:09:08
Base Year 2007 with traffic signal and Haleakala Highway wide

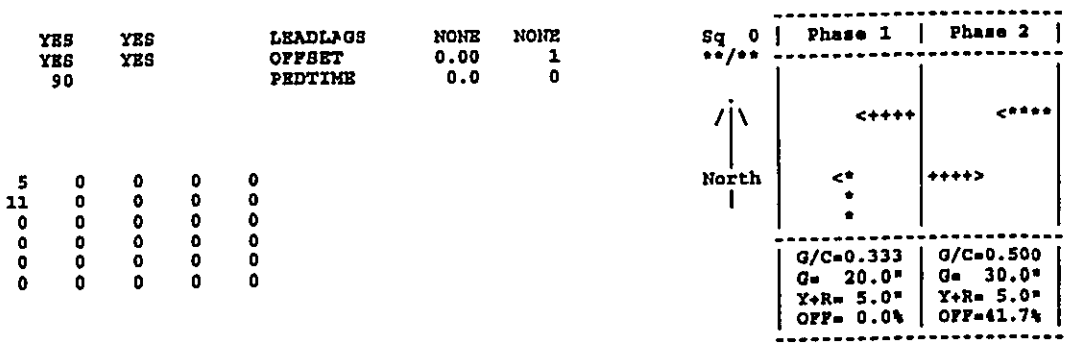
SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters										
SEQUENCES	0	0								
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	90	180	90					PEDTIME	0.0	0
GREENTIMES	55.00	25.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
PM Peak Hour of Traffic 14:11:30
Base Year 2007 with traffic signal and Haleakala Highway wide

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.54 Vehicle Delay 9.4 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								22.0	C+	
LT	12/1	0.281	0.333	528	590	428	0.725	22.0	*C+	308 ft
WB Approach								0.0	A	
TH	24/2	0.296	1.000	3539	3539	967	0.273	0.0	*A	13 ft
EB Approach								12.5	B+	
TH	24/2	0.356	0.500	1761	1770	1206	0.681	12.5	B+	381 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	870	0	5	0	385	705	1085	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli 04/26/04
PM Peak Hour of Traffic 14:11:37
Base Year 2007 with traffic signal and Haleakala Highway wide

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	180	60				PEDTIME	0.0	0
GREENTIMES	20.00	30.00							
YELLOWTIMES	5.00	5.00							
CRITICALS	9	5							
EXCESS	0								
PHASEMOVEMENTS	1	9	5	0	0	0	0		
PHASEMOVEMENTS	2	5	11	0	0	0	0		
PHASEMOVEMENTS	3	0	0	0	0	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

HCS2000: Ramps and Ramp Junctions Release 4.1d

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TL
Agency/Co.:	ATA
Date performed:	1/8/2004
Analysis time period:	AM peak
Freeway/Dir of Travel:	Haleakala Highway/westbound
Junction:	west of HH/OHH western int
Jurisdiction:	Maui
Analysis Year:	Base Year 2007 with widening
Description:	Hawaiian Home Lands Subdivisions

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1385	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	850	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1385	850		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	385	236		v
Trucks and buses	0	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, E_T	1.5	1.5		
Recreational vehicle PCE, E_R	1.2	1.2		
Heavy vehicle adjustment, f_{HV}	1.000	1.000		
Driver population factor, f_P	1.00	1.00		
Flow rate, vp	1539	944		pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)

$P_{FM}^{EQ} = 1.000$ Using Equation 0

$v_{12} = v_R (P_{FM}) = 1539$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2483	4500	No
v_{R12}	2667	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 21.3$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	$M_S = 0.342$	
Space mean speed in ramp influence area,	$S_R = 50.6$	mph
Space mean speed in outer lanes,	$S_O = N/A$	mph
Space mean speed for all vehicles,	$S = 50.6$	mph

HCS2000: Ramps and Ramp Junctions Release 4.1d

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TL
Agency/Co.:	ATA
Date performed:	1/8/2004
Analysis time period:	PM peak
Freeway/Dir of Travel:	Haleakala Highway/westbound
Junction:	west of HH/OHH western int
Jurisdiction:	Maui
Analysis Year:	Base Year 2007 with widening
Description:	Hawaiian Home Lands Subdivisions

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	870	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	870	385		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	242	107		v
Trucks and buses	0	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	1.000	1.000		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	967	428		pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)

P_{FM}^{EQ} = 1.000 Using Equation 0

$v_{12} = v_R (P_{FM})$ = 967 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1395	4500	No
v_{R12}	1511	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

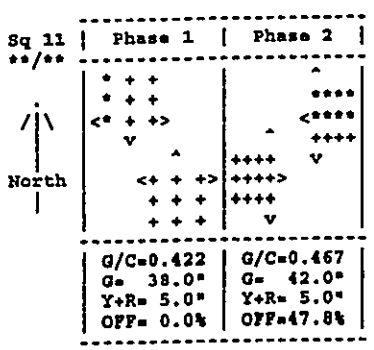
Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 51.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.1	mph

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:58:39

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Hakani Road
Degree of Saturation (v/c) 0.53 Vehicle Delay 21.5 Level of Service C+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								22.1	C+	
RT	12/1	0.344	0.422	559	669	406	0.607	24.3	*C+	366 ft
TH+LT	12/1	0.262	0.422	517	604	256	0.424	18.8	B	211 ft
NB Approach								16.4	B	
RT	12/1	0.189	0.422	559	669	106	0.158	16.6	B	84 ft
TH+LT	12/1	0.160	0.422	651	745	117	0.157	16.2	B	86 ft
WB Approach								24.5	C+	
RT+TH	24/2	0.386	0.467	1498	1640	1178	0.718	24.7	*C+	613 ft
LT	12/1	0.137	0.467	342	427	22	0.052	15.8	B	18 ft
EB Approach								14.9	B+	
RT+TH	24/2	0.191	0.467	1563	1648	412	0.250	14.6	B+	153 ft
LT	12/1	0.225	0.467	65	86	39	0.406	18.6	B	34 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:58:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Hakani Road

METROAREA	NONCBD											
SIMULATION PERIOD	15											
LEVELOFSERVICE	C	S										
NODELOCATION	0	0										
QUEUEMODELS	1	90	25	40								

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	365	105	125	50	1010	20	95	90	15	5	365	35
WIDTHS	12.0	12.0	0.0	0.0	24.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	2	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1430	0	0	3514	915	1583	1764	0	0	3531	205

Phasing Parameters

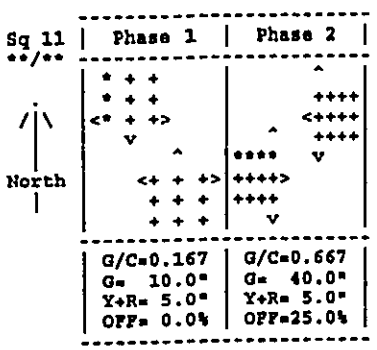
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	90		PEDTIME	0.0 0
GREENTIMES	38.00	42.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	5				
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:00:17

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Hakani Road
Degree of Saturation (v/c) 0.41 Vehicle Delay 8.2 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate eC (vph)	Service Rate gE (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								24.2	C+	
RT	12/1	0.115	0.167	171	264	94	0.356	25.9	*C+	74 ft
TH+LT	12/1	0.076	0.167	226	296	83	0.280	22.4	C+	59 ft
NB Approach								22.4	C+	
RT	12/1	0.059	0.167	171	264	28	0.106	22.0	C+	22 ft
TH+LT	12/1	0.082	0.167	233	304	95	0.313	22.6	C+	68 ft
WB Approach								7.1	A	
RT+TH	24/2	0.290	0.667	2347	2347	939	0.400	7.2	A	256 ft
LT	12/1	0.000	0.667	285	325	39	0.120	5.8	A	19 ft
EB Approach								5.3	A	
RT+TH	24/2	0.304	0.667	2356	2356	1005	0.427	4.8	A	198 ft
LT	12/1	0.464	0.667	287	319	183	0.574	7.9	*A	89 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:00:25

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Hakani Road

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	85	65	10	30	815	35	25	80	5	10	895	165
WIDTHS	12.0	12.0	0.0	0.0	24.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	2	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1775	0	0	3521	487	1583	1825	0	0	3533	479

Phasing Parameters

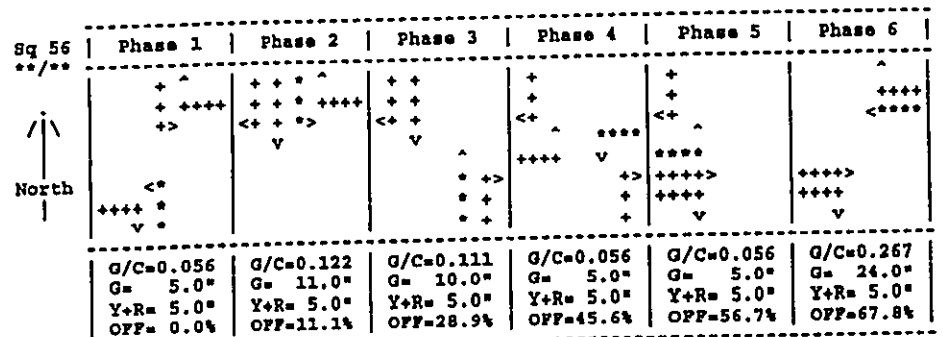
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	60		PEDTIME	0.0 0
GREENTIMES	10.00	40.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	12				
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:06:10

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.63 Vehicle Delay 34.2 Level of Service C



C= 90 sec G= 60.0 sec = 66.7% Y=30.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @X (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								31.4	C	
RT	12/1	0.296	0.511	729	809	311	0.384	14.8	B+	226 ft
TH	12/1	0.268	0.289	405	538	361	0.671	31.5	C	373 ft
LT	12/1	0.270	0.233	272	413	344	0.833	46.4	*D	411 ft
NB Approach								46.2	D	
RT	12/1	0.128	0.222	168	348	11	0.031	27.6	C	12 ft
TH	12/1	0.166	0.111	1	190	144	0.696	48.3	*D	176 ft
LT	12/1	0.132	0.056	1	80	39	0.398	43.7	*D+	47 ft
WB Approach								36.5	D+	
RT	12/1	0.305	0.556	774	880	306	0.348	15.6	B	254 ft
TH	24/2	0.300	0.267	710	944	844	0.894	44.1	*D+	550 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								31.0	C	
RT	12/1	0.169	0.489	650	774	72	0.093	15.3	B	64 ft
TH	24/2	0.174	0.378	1155	1337	339	0.254	21.6	C+	164 ft
LT	12/1	0.217	0.167	137	285	233	0.790	49.5	*D	289 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:06:23

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	280	325	310	275	760	5	10	130	35	65	305	210
WIDTHS	12.0	12.0	12.0	12.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	2	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	1583	3539	1770	1583	1863	1770	1583	3539	1770

Phasing Parameters

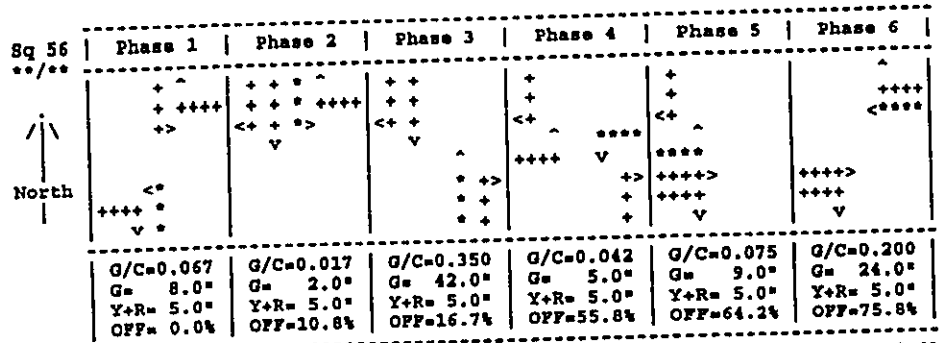
SEQUENCES	56	56						
PERMISSIVES	NO	NO	NO	NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1
CYCLES	90	180	90			PEDTIME	0.0	0
GREENTIMES	5.00	11.00	10.00	5.00	5.00	24.00		
YELLOWTIMES	5.00	5.00	5.00	5.00	5.00	5.00		
CRITICALS		9	3	8	6	12	5	
EXCESS		0						

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:07:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.69 Vehicle Delay 51.3 Level of Service D



C=120 sec G= 90.0 sec = 75.0% Y=30.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@X	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								36.2	D+	
RT	12/1	0.301	0.608	879	963	172	0.179	10.7	B+	127 ft
TH	12/1	0.335	0.408	580	761	378	0.497	26.9	C+	417 ft
LT	12/1	0.283	0.125	1	192	189	0.855	77.9	*E	322 ft
NB Approach								63.1	E+	
RT	12/1	0.245	0.433	503	686	22	0.032	19.6	B	23 ft
TH	12/1	0.425	0.350	422	652	622	0.954	62.5	*E+	980 ft
LT	12/1	0.258	0.067	1	90	89	0.754	78.8	*E	154 ft
WB Approach								61.9	E+	
RT	12/1	0.378	0.367	274	581	300	0.516	36.2	D+	383 ft
TH	24/2	0.350	0.200	1	703	683	0.965	73.2	*E	628 ft
LT	12/1	0.252	0.042	1	51	11	0.149	56.4	*E+	18 ft
EB Approach								43.4	D+	
RT	12/1	0.340	0.425	408	673	211	0.314	27.7	C	251 ft
TH	24/2	0.330	0.317	475	1121	561	0.500	36.1	D+	387 ft
LT	12/1	0.322	0.158	1	254	244	0.871	73.8	*E	410 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
14:07:29

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	155	340	170	270	615	10	20	560	80	190	505	220
WIDTHS	12.0	12.0	12.0	12.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	2	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	1583	3539	1770	1583	1863	1770	1583	3539	1770

Phasing Parameters

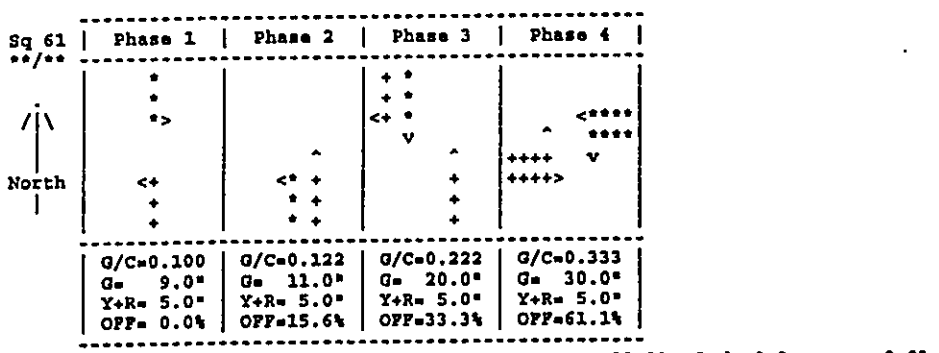
SEQUENCES	56	56				LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO		OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES		PEDTIME	0.0	0
CYCLES	120	120	90					
GREENTIMES	8.00	2.00	42.00	5.00	9.00	24.00		
YELLOWTIMES	5.00	5.00	5.00	5.00	5.00	5.00		
CRITICALS	9	3	8	6	12	5		
EXCESS	0							

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:42:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.68 Vehicle Delay 31.7 Level of Service C



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								38.5	D+	
RT	12/1	0.123	0.222	160	347	6	0.017	27.9	C	7 ft
TH	24/2	0.239	0.222	533	786	600	0.763	37.9	*D+	368 ft
LT	12/1	0.154	0.100	1	159	100	0.565	42.8	*D+	121 ft
NB Approach								29.5	C	
TH	24/2	0.330	0.400	1244	1416	961	0.679	26.6	C+	510 ft
LT	12/1	0.290	0.278	345	492	367	0.746	37.2	*D+	412 ft
WB Approach								30.9	C	
TH+LT	12/1	0.312	0.333	337	438	306	0.699	30.9	*C	321 ft
EB Approach								22.4	C+	
TH+LT	12/1	0.182	0.333	494	614	178	0.290	22.4	C+	153 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:43:04

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	540	90	170	125	150	155	865	330	560	155	5
WIDTHS	12.0	24.0	12.0	12.0	12.0	0.0	12.0	24.0	12.0	12.0	12.0	0.0
LANES	1	2	1	1	1	0	1	2	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	3539	1770	0	1314	0	0	3539	1770	0	1841	0

Phasing Parameters

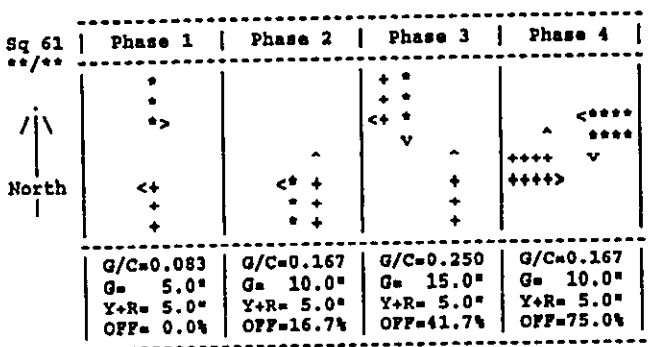
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	90		PEDTIME	0.0 0
GREENTIMES	9.00	11.00	20.00	30.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:45:06

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.68 Vehicle Delay 23.5 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								28.9	C	
RT	12/1	0.027	0.250	305	396	6	0.015	17.6	B	. 5 ft
TH	24/2	0.234	0.250	800	885	739	0.835	29.0	*C	329 ft
LT	12/1	0.068	0.083	93	137	72	0.490	28.8	*C	60 ft
NB Approach								19.7	B	
TH	24/2	0.286	0.500	1735	1770	933	0.527	12.9	B+	305 ft
LT	12/1	0.326	0.333	520	590	506	0.858	32.3	*C	419 ft
WB Approach								30.3	C	
TH+LT	12/1	0.155	0.167	190	254	172	0.675	30.3	*C	139 ft
EB Approach								22.8	C+	
TH+LT	12/1	0.090	0.167	233	304	106	0.349	22.8	C+	76 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Base Year 2007 with Halekala Highway widening

04/26/04
13:45:16

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	5	665	65	80	80	75	65	840	455	425	90	5
VOLUMES	12.0	24.0	12.0	12.0	12.0	0.0	12.0	24.0	12.0	12.0	12.0	0.0
WIDTHS	1	2	1	1	1	0	1	2	1	1	1	0
LANES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	2	2	2	3	3	3	2	2	2	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1583	3539	1770	0	1527	0	0	3539	1770	0	1824	0
SATURATIONFLOWS												

Phasing Parameters

SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	60		PEDTIME	0.0 0
GREENTIMES	5.00	10.00	15.00	10.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information		
Analyst	MN	Jurisdiction/Date	Jurisdiction	5/3/2004
Agency or Company	ATA	Major Street	Kula Highway	
Analysis Period/Year	AM Peak 2007	Minor Street	King Kekaulike School	
Comment	Base Year 2007 with Mitigative Measures			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	T	T		LT
Lane 3	L	LT		
Lane 4				
Lane 5				

	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)	230	980	5	5	1205	135	5	0	5	20	0	125
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	256	1089	6	6	1339	150	6	0	6	22	0	139
Flare storage (# of vehs)												0
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

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	LTR	12	16	0.742	2	448.2	F	448.2
	2								F
	3								
WB	1	R	139	397	0.350	2	18.6	C	191.5
	2	LT	22	10	2.189	4	1282.0	F	F
	3								
SB		①	256	508	0.505	3	19.2	C	
NB		④	6	628	0.009	0	10.8	B	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information		
Analyst	MN	Jurisdiction/Date	Jurisdiction	5/3/2004
Agency or Company	ATA	Major Street	Kula Highway	
Analysis Period/Year	PM Peak 2007	Minor Street	King Kekaulike School	
Comment	Base Year 2007 with Mitigative Measures			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	T	T		LT
Lane 3	L	LT		
Lane 4				
Lane 5				

	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)	20	1155	5	5	1310	5	5	0	5	10	0	30
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	1283	6	6	1456	6	6	0	6	11	0	33
Flare storage (# of vehs)												0
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

Output Data

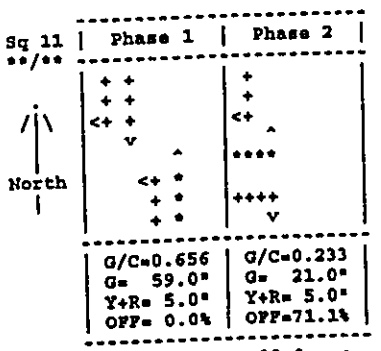
	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	LTR	12	50	0.238	1	97.7	F	97.7
	2								F
	3								
WB	1	R	33	364	0.091	0	15.9	C	70.0
	2	LT	11	25	0.438	1	232.3	F	F
	3								
SB		①	22	456	0.049	0	13.3	B	
NB		④	6	529	0.011	0	11.9	B	

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Halekala Highway widening
AM Peak Hour of Traffic

04/26/04
13:38:42

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.59 Vehicle Delay 15.3 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								5.8	A	
RT	12/1	0.463	1.000	1583	1583	600	0.379	0.7	A	46 ft
TH	12/1	0.358	0.656	1148	1221	528	0.432	11.6	B+	406 ft
NB Approach								17.2	B	
TH	12/1	0.590	0.656	1192	1221	1050	0.860	18.7	*B	949 ft
LT	12/1	0.341	0.656	400	441	161	0.365	7.5	A	92 ft
EB Approach								31.1	C	
RT	12/1	0.182	0.233	189	368	94	0.255	29.8	C	98 ft
LT	24/2	0.203	0.233	578	801	450	0.562	31.3	*C	242 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Halekala Highway widening
AM Peak Hour of Traffic

04/26/04
13:38:49

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	540	475	0	0	0	0	0	945	145	85	0	405
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	24.0
LANES	1	1	0	0	0	0	0	1	1	1	0	2
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	673	1583	0	3433

Phasing Parameters

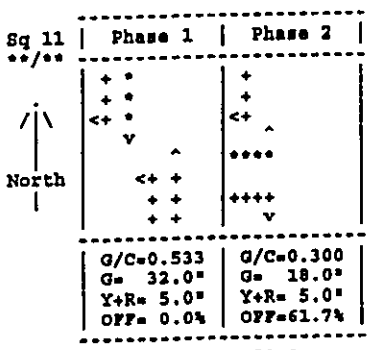
SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	180	90				
GREENTIMES	59.00	21.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Halekala Highway widening
PM Peak Hour of Traffic

04/26/04
13:39:28

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.67 Vehicle Delay 16.1 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Modal 1
SB Approach								14.2	B+	
RT	12/1	0.337	1.000	1583	1583	450	0.284	0.5	A	23 ft
TH	12/1	0.477	0.533	945	993	833	0.839	21.7	*C+	612 ft
NB Approach								12.4	B+	
TH	12/1	0.393	0.533	963	993	678	0.683	12.2	B+	393 ft
LT	12/1	0.017	0.533	95	119	67	0.540	13.9	B+	41 ft
EB Approach								21.9	C+	
RT	12/1	0.131	0.300	395	475	117	0.246	17.1	B	77 ft
LT	24/2	0.253	0.300	961	1030	789	0.766	22.6	*C+	309 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Halekala Highway widening
PM Peak Hour of Traffic

04/26/04
13:39:35

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUENODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	405	750	0	0	0	0	0	610	60	105	0	710
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	24.0
LANES	1	1	0	0	0	0	0	1	1	1	0	2
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	233	1583	0	3433

Phasing Parameters

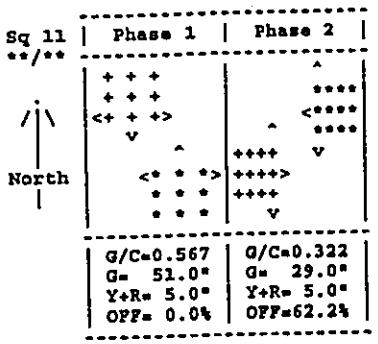
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	32.00	18.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Traffic Signal
AM Peak Hour of Traffic

04/26/04
13:46:38

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.65 Vehicle Delay 19.9 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								18.8	B	
RT+TH+LT	12/1	0.427	0.567	834	924	578	0.626	18.8	B	523 ft
NB Approach								17.7	B	
RT+TH+LT	12/1	0.468	0.567	968	1022	762	0.746	17.7	*B	648 ft
WB Approach								27.1	C+	
RT+TH+LT	12/1	0.266	0.322	411	526	306	0.582	27.1	*C+	299 ft
EB Approach								22.2	C+	
RT+TH+LT	12/1	0.158	0.322	324	427	77	0.180	22.2	C+	66 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Traffic Signal
AM Peak Hour of Traffic

04/26/04
13:46:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				0.0
GRADES	0.0	0.0	0.0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	40	430	50	245	25	5	5	655	25	20	10	40
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
LANES	0	1	0	0	1	0	0	1	0	0	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1631	0	0	1633	0	0	1804	0	0	1325	0

Phasing Parameters

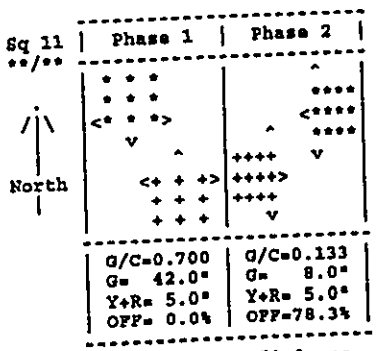
SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	180	90				
GREENTIMES	51.00	29.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Traffic Signal
PM Peak Hour of Traffic

04/26/04
13:48:26

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.68 Vehicle Delay 14.8 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								19.1	B	
SB Approach										
RT+TH+LT	12/1	0.631	0.700	981	1012	873	0.863	19.1	*B	623 ft
								4.3	A	
NB Approach										
RT+TH+LT	12/1	0.357	0.700	1251	1251	578	0.462	4.3	A	208 ft
								28.8	C	
WB Approach										
RT+TH+LT	12/1	0.116	0.133	154	212	129	0.594	28.8	*C	104 ft
								24.5	C+	
EB Approach										
RT+TH+LT	12/1	0.072	0.133	134	186	61	0.316	24.5	C+	46 ft

Hawaiian Homelands Subdivisions at Waiohuli
Base Year 2007 with Traffic Signal
PM Peak Hour of Traffic

04/26/04
13:48:32

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	50	575	160	95	15	5	5	495	20	10	15	30
VOLUMES	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
WIDTHS	0	1	0	0	1	0	0	1	0	0	1	0
LANES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	2	2	2	3	3	3	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1446	0	0	1628	0	0	1787	0	0	1444	0

Phasing Parameters

SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	60	180	10				
GREENTIMES	42.00	8.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	5					
EXCESS	0						

ATA AUSTIN TSUTSUMI & ASSOCIATES, INC
CIVIL ENGINEERS • SURVEYORS

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

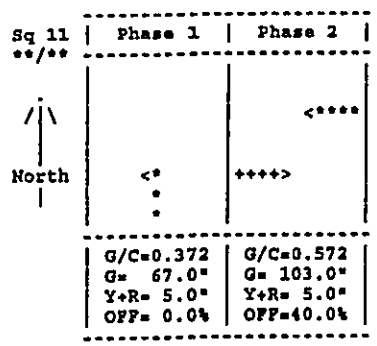
- Year 2007 Scenario A,
  With The Project

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:34:47

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 1.24 Vehicle Delay 200.4 Level of Service F



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								234.7	F	
LT	12/1	0.606	0.372	1	631	906	1.375	234.7	*F	2811 ft
WB Approach								220.3	F	
TH	12/1	0.810	0.572	856	1066	1483	1.391	220.3	*F	4603 ft
EB Approach								18.2	B	
TH	24/2	0.407	0.572	1700	2025	333	0.164	18.2	B	190 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:34:54

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	1335	0	5	0	815	250	300	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

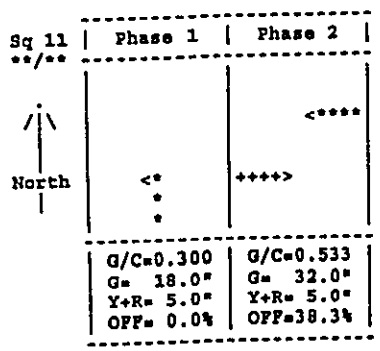
SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	67.00	103.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:46:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.56 Vehicle Delay 12.0 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								12.0	B+	
TH	12/1	0.388	0.533	963	993	667	0.672	12.0	*B+	383 ft
EB Approach								8.8	A	
TH	24/2	0.268	0.533	1888	1888	872	0.462	8.8	A	225 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:46:25

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	600	0	5	0	295	650	785	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Phasing Parameters

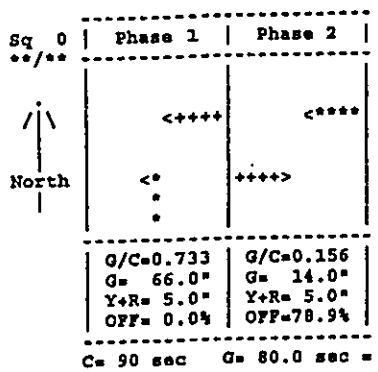
SEQUENCES	11	11					
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	18.00	32.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:30:24

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.74 Vehicle Delay 3.7 Level of Service A



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Pad= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								8.2	A	
LT	12/1	0.546	0.733	1289	1298	906	0.698	8.2	*A	573 ft
WB Approach								2.5	A	
TH	12/1	0.789	1.000	1863	1863	1483	0.796	2.5	*A	159 ft
EB Approach								37.3	D+	
TH	24/2	0.173	0.156	242	551	333	0.604	37.3	D+	199 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:30:30

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	1335	0	5	0	815	250	300	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli 05/01/04
AM Peak Hour of Traffic 14:30:30
Year 2007 excluding other developments, with project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

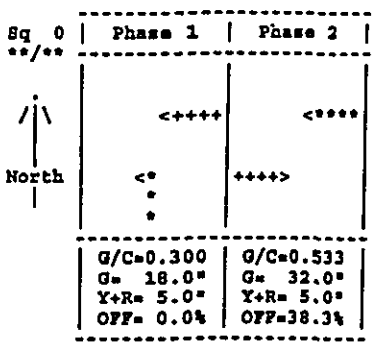
Phasing Parameters

SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	60	180	10				PEDTIME	0.0	0
GREENTIMES	66.00	14.00							
YELLOWTIMES	5.00	5.00							
CRITICALS	9	5							
EXCESS	0								
PHASEMOVEMENTS	1	9	5	0	0	0	0		
PHASEMOVEMENTS	2	5	11	0	0	0	0		
PHASEMOVEMENTS	3	0	0	0	0	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli 05/01/04
PM Peak Hour of Traffic 14:40:19
Year 2007 excluding other developments, with project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.45 Vehicle Delay 7.7 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								20.2	C+	
LT	12/1	0.226	0.300	465	531	328	0.618	20.2	*C+	228 ft
WB Approach								0.1	A	
TH	12/1	0.388	1.000	1863	1863	667	0.358	0.1	*A	20 ft
EB Approach								8.8	A	
TH	24/2	0.268	0.533	1888	1888	872	0.462	8.8	A	225 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	600	0	5	0	295	650	785	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	1	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
14:40:31

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

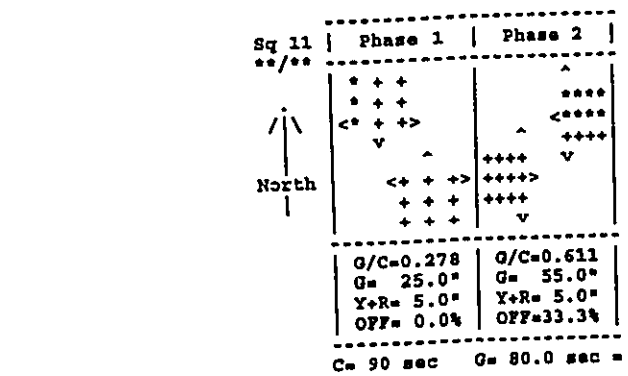
SEQUENCES	0	0					
PERMISSIVES	YES	YES	YES	YES		LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00 1
CYCLES	60	180	10			PEDTIME	0.0 0
GREENTIMES	18.00	32.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	9	5					
EXCESS	0						
PHASEMOVEMENTS	1	9	5	0	0	0	0
PHASEMOVEMENTS	2	5	11	0	0	0	0
PHASEMOVEMENTS	3	0	0	0	0	0	0
PHASEMOVEMENTS	4	0	0	0	0	0	0
PHASEMOVEMENTS	5	0	0	0	0	0	0
PHASEMOVEMENTS	6	0	0	0	0	0	0

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:48:01

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.73 Vehicle Delay 39.8 Level of Service D+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								48.4	D	
RT	12/1	0.344	0.278	276	440	406	0.923	58.9	*E+	536 ft
TH+LT	12/1	0.231	0.278	294	412	217	0.527	28.8	C	218 ft
NB Approach								25.9	C+	
RT	12/1	0.189	0.278	276	440	106	0.241	26.4	C+	104 ft
TH+LT	12/1	0.160	0.278	358	489	117	0.239	25.4	C+	107 ft
WB Approach								47.3	D	
RT+TH	12/1	0.645	0.611	1048	1131	1117	0.988	48.0	*D	1370 ft
LT	12/1	0.134	0.611	571	644	22	0.034	9.9	A	16 ft
EB Approach								8.2	A	
RT+TH	24/2	0.167	0.611	2141	2156	306	0.142	7.5	A	82 ft
LT	12/1	0.225	0.611	59	75	39	0.470	13.7	B+	30 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:48:17

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters	SB	WB	NB	EB
APPLABELS	0.0	0.0	0.0	0.0
GRADES	0	0	0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	365	105	90	45	960	20	95	90	15	5	270	35
VOLUMES	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
WIDTHS	1	1	0	0	1	1	1	1	0	0	2	1
LANES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	3	3	3	2	2	2	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1583	1482	0	0	1850	1053	1583	1759	0	0	3529	135
SATURATIONFLOWS												

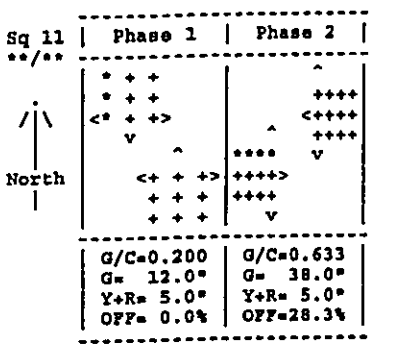
Phasing Parameters							
SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	90	90				
GREENTIMES	25.00	55.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	1	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:51:50

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.39 Vehicle Delay 9.5 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								21.7	C+	
RT	12/1	0.115	0.200	225	317	94	0.297	22.8	*C+	71 ft
TH+LT	12/1	0.076	0.200	286	357	83	0.232	20.5	C+	56 ft
NB Approach								20.5	C+	
RT	12/1	0.059	0.200	225	317	28	0.088	20.1	C+	21 ft
TH+LT	12/1	0.082	0.200	294	366	95	0.260	20.6	C+	65 ft
WB Approach								9.3	A	
RT+TH	12/1	0.376	0.633	1139	1172	628	0.536	9.4	A	357 ft
LT	12/1	0.000	0.633	420	463	39	0.084	6.3	A	19 ft
EB Approach								5.5	A	
RT+TH	24/2	0.215	0.633	2236	2236	672	0.301	5.1	A	129 ft
LT	12/1	0.398	0.633	328	361	183	0.507	7.1	*A	87 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:52:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	65	10	25	540	35	25	80	5	10	595	165
WIDTHS	12.0	12.0	0.0	0.0	12.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	1	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1785	0	0	1850	731	1583	1830	0	0	3531	570

Phasing Parameters

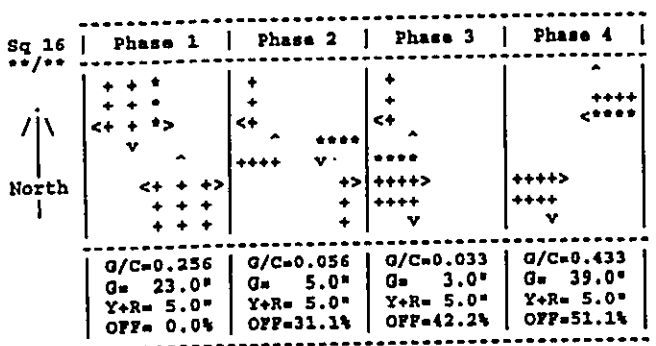
SEQUENCES	11	11						
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE	
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1	
CYCLES	60	60	60		PEDTIME	0.0	0	
GREENTIMES	12.00	38.00						
YELLOWTIMES	5.00	5.00						
CRITICALS	1	12						
EXCESS	0							

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:56:36

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.67 Vehicle Delay 41.7 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								37.5	D+	
RT	12/1	0.296	0.456	623	721	311	0.431	18.5	B	249 ft
TH	12/1	0.234	0.256	335	476	289	0.607	31.8	C	299 ft
LT	12/1	0.315	0.256	217	323	300	0.920	62.9	*E+	402 ft
NB Approach								26.1	C+	
RT	12/1	0.128	0.367	451	581	11	0.019	18.2	B	10 ft
TH	12/1	0.155	0.256	335	476	111	0.233	26.8	C+	104 ft
LT	12/1	0.157	0.256	111	171	33	0.180	26.6	C+	32 ft
WB Approach								47.7	D	
RT	12/1	0.298	0.433	546	686	294	0.429	22.7	C+	273 ft
TH	12/1	0.486	0.433	684	807	794	0.984	57.0	*E+	1017 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								40.8	D+	
RT	12/1	0.132	0.522	712	827	17	0.021	13.2	B+	15 ft
TH	24/2	0.157	0.522	1729	1848	250	0.135	14.1	B+	105 ft
LT	12/1	0.217	0.144	74	243	233	0.910	71.4	*E	323 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:56:43

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	280	260	270	265	715	5	10	100	30	15	225	210
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1277	1583	1863	1770	1583	1863	717	1583	3539	1770

Phasing Parameters

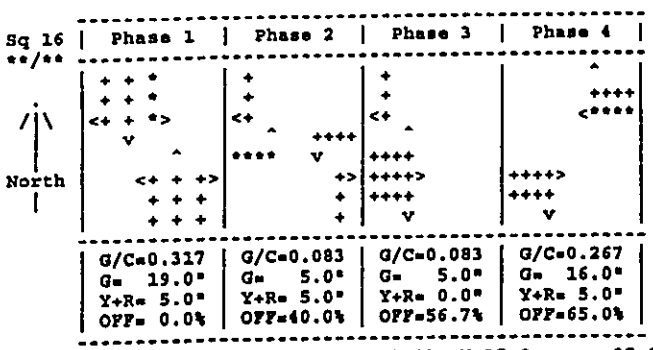
SEQUENCES	16	16				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	90	90		PEDTIME	0.0 0
GREENTIMES	23.00	5.00	3.00	39.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	6	12	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
15:00:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.60 Vehicle Delay 26.1 Level of Service C+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @X	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								24.0	C+	
RT	12/1	0.175	0.567	866	897	183	0.204	6.9	A	80 ft
TH	12/1	0.221	0.317	525	590	339	0.575	18.5	B	227 ft
LT	12/1	0.361	0.317	128	165	150	0.882	57.3	*E+	148 ft
NB Approach								22.0	C+	
RT	12/1	0.052	0.483	717	765	22	0.029	8.2	A	11 ft
TH	12/1	0.273	0.317	525	590	439	0.744	23.4	C+	323 ft
LT	12/1	0.000	0.317	200	250	50	0.200	15.4	B	30 ft
WB Approach								29.0	C	
RT	12/1	0.196	0.267	332	422	217	0.514	23.9	C+	165 ft
TH	12/1	0.258	0.267	423	497	406	0.817	31.8	*C	334 ft
LT	12/1	0.018	0.083	93	137	11	0.075	25.6	C+	9 ft
EB Approach								28.8	C	
RT	12/1	0.081	0.350	472	554	50	0.090	14.7	B+	35 ft
TH	24/2	0.131	0.350	1170	1239	372	0.300	15.7	B	127 ft
LT	12/1	0.188	0.167	225	295	261	0.885	50.1	*D	248 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
15:00:51

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	165	305	135	195	365	10	20	395	45	45	335	235
WIDTHS	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	1	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	537	1583	1863	1770	1583	1863	791	1583	3539	1770

Phasing Parameters

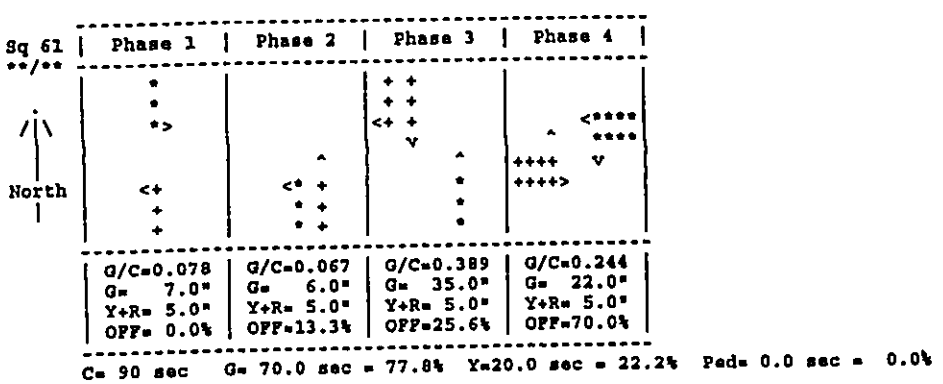
SEQUENCES	16	16					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	10		PEDTIME	0.0	0
GREENTIMES	19.00	5.00	5.00	16.00			
YELLOWTIMES	5.00	5.00	0.00	5.00			
CRITICALS	3	12	0	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:20:30

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.80 Vehicle Delay 41.2 Level of Service D+



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								31.8	C	
RT	12/1	0.123	0.389	463	616	6	0.010	19.0	B	6 ft
TH	12/1	0.334	0.389	591	724	478	0.660	27.7	C	482 ft
LT	12/1	0.152	0.078	1	119	94	0.681	53.3	*D	121 ft
NB Approach								46.4	D	
TH	12/1	0.537	0.511	846	952	900	0.945	43.6	*D+	1058 ft
LT	12/1	0.257	0.200	203	349	306	0.864	54.5	*D	389 ft
WB Approach								46.6	D	
TH+LT	12/1	0.282	0.244	195	298	244	0.805	46.6	*D	295 ft
EB Approach								28.9	C	
TH+LT	12/1	0.179	0.244	307	450	173	0.384	28.9	C	169 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:21:13

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	430	85	170	100	120	140	810	275	445	150	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1239	0	0	1863	1770	0	1840	0

Phasing Parameters

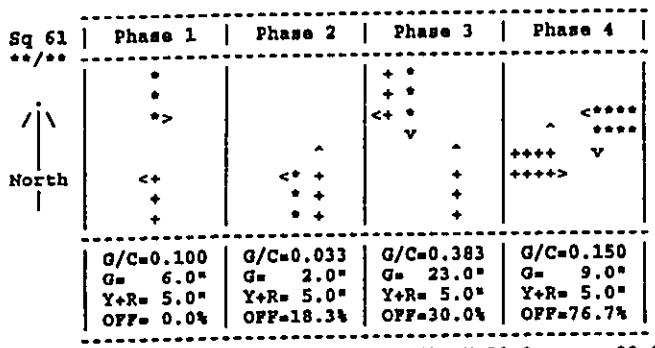
SEQUENCES	61	61			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	90	90				
GREENTIMES	7.00	6.00	35.00	22.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	8	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:23:26

SIGNAL2000/TRAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.61 Vehicle Delay 20.3 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								20.9	C+	
RT	12/1	0.027	0.383	529	607	6	0.010	12.9	B+	4 ft
TH	12/1	0.304	0.383	648	714	494	0.692	20.3	*C+	354 ft
LT	12/1	0.060	0.100	118	169	61	0.345	26.3	*C+	48 ft
NB Approach								18.8	B	
TH	12/1	0.333	0.500	879	931	550	0.591	14.2	B+	351 ft
LT	12/1	0.194	0.217	311	383	272	0.710	28.1	*C	218 ft
WB Approach								25.6	C+	
TH+LT	12/1	0.116	0.150	163	222	117	0.518	25.6	*C+	91 ft
EB Approach								23.2	C+	
TH+LT	12/1	0.071	0.150	202	271	78	0.288	23.2	C+	56 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:23:34

SIGNAL2000/TRAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUENODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	5	445	55	80	55	50	35	495	245	255	65	5
WIDTHS	12.0	12.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	12.0	12.0	0.0
LANES	1	1	1	1	1	0	1	1	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	0	1509	0	0	1863	1770	0	1806	0

Phasing Parameters

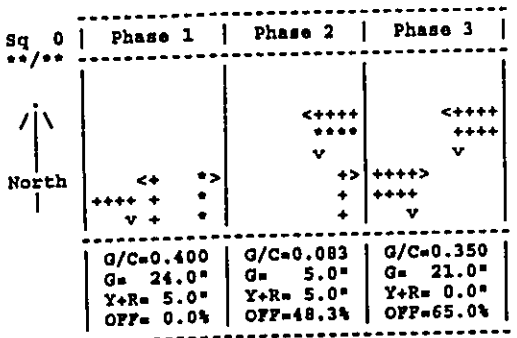
SEQUENCES	61	61					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	6.00	2.00	23.00	9.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	2	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:59:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.56 Vehicle Delay 18.2 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								25.3	C+	
RT	12/1	0.228	0.567	866	897	272	0.303	7.7	*A	123 ft
LT	12/1	0.395	0.400	655	708	644	0.910	32.8	C	540 ft
WB Approach								13.8	B+	
TH	12/1	0.163	0.433	759	807	233	0.289	11.2	B+	120 ft
LT	12/1	0.005	0.083	499	548	350	0.639	15.5	*B	226 ft
EB Approach								6.6	A	
RT	12/1	0.216	0.750	1188	1188	250	0.210	2.6	A	71 ft
TH	12/1	0.080	0.267	427	497	94	0.189	17.2	B	58 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:59:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	210	315	245	0	580	225	85	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:59:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

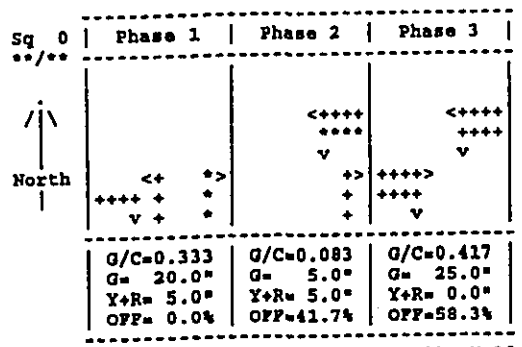
Phasing Parameters										
SEQUENCES	0	0								
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	24.00	5.00	21.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
16:01:11

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Avsrages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.48 Vehicle Delay 11.5 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
NB Approach								14.4	B+	
RT	12/1	0.293	0.500	748	792	383	0.484	12.0	*B+	209 ft
LT	12/1	0.220	0.333	528	590	317	0.537	17.2	B	206 ft
WB Approach								13.9	B+	
TH	12/1	0.105	0.500	895	931	133	0.143	8.1	A	57 ft
LT	12/1	0.025	0.083	491	534	378	0.708	15.9	*B	247 ft
EB Approach								7.2	A	
RT	12/1	0.373	0.750	1188	1188	522	0.439	4.0	A	174 ft
TH	12/1	0.148	0.333	558	621	206	0.332	15.3	B	123 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

APPLABELS	SB	WB	NB	EB
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	120	340	345	0	285	470	185	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli 05/01/04
PM Peak Hour of Traffic 16:01:24
Year 2007 excluding other developments, with project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

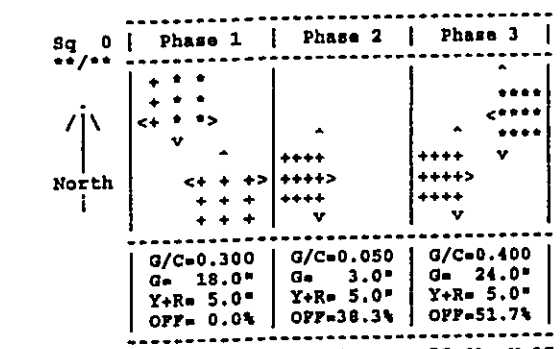
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES		LEADLAGS	NONE	NONE	
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1	
CYCLES	60	120	10			PEDTIME	0.0	0	
GREENTIMES	20.00	5.00	25.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:39:27

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.54 Vehicle Delay 16.3 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@X	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								19.9	B	
RT	12/1	0.212	0.300	395	475	244	0.514	21.3	C+	170 ft
TH+LT	12/1	0.128	0.300	313	373	105	0.282	16.5	*B	65 ft
NB Approach								22.2	C+	
RT+TH+LT	12/1	0.245	0.300	427	492	333	0.677	22.2	C+	241 ft
WB Approach								17.6	B	
RT+TH+LT	12/1	0.310	0.400	597	651	439	0.674	17.6	*B	292 ft
EB Approach								8.5	A	
RT+TH	12/1	0.266	0.533	956	986	422	0.428	8.8	A	202 ft
LT	12/1	0.060	0.533	913	944	61	0.065	6.8	A	24 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:39:40

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	220	40	55	65	275	55	190	80	30	20	360	55
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1243	0	0	1627	0	0	1641	0	0	1848	1770

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:39:40

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

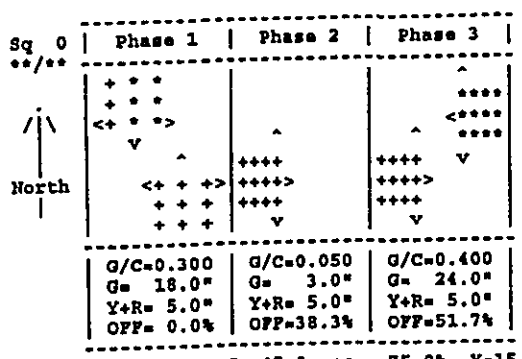
Phasing Parameters									
SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	120	10							
GREENTIMES	18.00	3.00	24.00							
YELLOWTIMES	5.00	5.00	5.00							
CRITICALS	2	6	5							
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project

05/01/04
15:57:31

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.43 Vehicle Delay 14.2 Level of Service B+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								22.7	C+	
RT	12/1	0.252	0.300	395	475	311	0.655	25.2	C+	230 ft
TH+LT	12/1	0.112	0.300	405	469	117	0.249	16.2	*B	71 ft
NB Approach								16.1	B	
RT+TH+LT	12/1	0.111	0.300	444	509	127	0.250	16.1	B	77 ft
WB Approach								14.3	B+	
RT+TH+LT	12/1	0.247	0.400	616	670	344	0.513	14.3	*B+	207 ft
EB Approach								8.2	A	
RT+TH	12/1	0.209	0.533	948	978	311	0.318	8.1	A	139 ft
LT	12/1	0.238	0.533	913	944	350	0.371	8.4	A	162 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Makawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	280	60	45	65	205	40	30	65	20	30	250	315
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1563	0	0	1676	0	0	1695	0	0	1833	1770

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Year 2007 excluding other developments, with project
05/01/04
15:57:49

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0					
PERMISSIVES	NO	NO	NO	NO			
OVERLAPS	YES	YES	YES	YES			
CYCLES	60	120	10				
GREENTIMES	18.00	3.00	24.00				
YELLOWTIMES	5.00	5.00	5.00				
CRITICALS	2	6	5				
EXCESS	0						
PHASEMOVEMENTS	1	1	2	3	7	8	9
PHASEMOVEMENTS	2	10	11	12	0	0	0
PHASEMOVEMENTS	3	4	5	6	10	11	12
PHASEMOVEMENTS	4	0	0	0	0	0	0
PHASEMOVEMENTS	5	0	0	0	0	0	0
PHASEMOVEMENTS	6	0	0	0	0	0	0

LEADLAGS	NONE	NONE
OFFSET	0.00	1
PEDTIME	0.0	0

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	KING KEKAULIKE SCHOOL
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		TR			R			LTR			R	
Lane 2		L			LT						LT	
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)	230	735	5	5	1070	140	5	0	5	20	0	125
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	256	817	6	6	1189	156	6	0	6	22	0	139
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
EB	1	LTR	13	7	1.902	3	1436.5	F	1436.5
	2								F
	3								
WB	1	R	150	228	.658	4	46.8	E	191.3
	2	LT	22	11	2.043	4	1176.1	F	F
	3								
		①	256	509	.502	3	19	C	
		④	6	803	.007	<1	9.5	A	

1 of 1

HICAP 2000 TM
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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	KING KEKAULIKE SCHOOL
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		TR			R			LTR			R	
Lane 2		L			LT						LT	
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)	20	740	5	5	730	5	5	0	5	10	0	30
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	22	822	6	6	811	6	6	0	6	11	0	33
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
EB	1	LTR	12	107	.112	<1	42.7	E	42.7
	2								E
	3								
WB	1	R	33	378	.087	<1	15.4	C	28.1
	2	LT	11	70	.158	1	66.1	F	D
	3								
		①	22	807	.028	<1	9.6	A	
		④	6	799	.007	<1	9.5	A	

1 of 1

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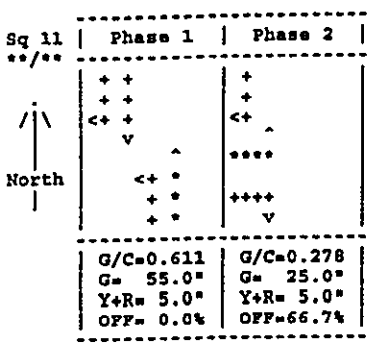
Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
13:55:24

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.63 Vehicle Delay 19.6 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph) @S	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach							8.4	A	
RT	12/1	0.319	1.000	1583	1583	333	0.210	0.3	A	21 ft
TH	12/1	0.353	0.611	1055	1138	517	0.454	13.6	B+	416 ft
NB Approach							24.0	C+	
TH	12/1	0.579	0.611	1097	1138	1028	0.903	25.4	*C+	1041 ft
LT	12/1	0.238	0.611	356	402	89	0.221	8.2	A	50 ft
EB Approach							31.0	C	
RT	12/1	0.169	0.278	276	440	72	0.164	25.4	C+	70 ft
LT	12/1	0.262	0.278	360	492	328	0.667	32.2	*C	343 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
13:55:37

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	300	465	0	0	0	0	0	925	80	65	0	295
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	657	1583	0	1770

Phasing Parameters

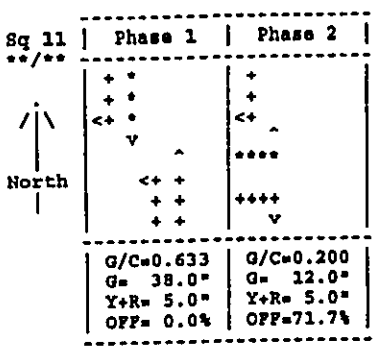
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	90	10		PEDTIME	0.0	0
GREENTIMES	55.00	25.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:17:22

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.53 Vehicle Delay 9.9 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								9.5	A	
RT	12/1	0.115	1.000	1583	1583	94	0.059	0.1	A	4 ft
TH	12/1	0.424	0.633	1147	1180	728	0.617	10.7	*B+	432 ft
NB Approach								6.7	A	
TH	12/1	0.379	0.633	1171	1180	650	0.551	6.8	A	291 ft
LT	12/1	0.000	0.633	254	287	17	0.059	4.3	A	6 ft
EB Approach								22.0	C+	
RT	12/1	0.059	0.200	225	317	28	0.088	20.1	C+	21 ft
LT	12/1	0.135	0.200	283	354	172	0.486	22.3	*C+	124 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
PM Peak Hour of Traffic

05/01/04
14:17:42

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	85	655	0	0	0	0	0	585	15	25	0	155
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0
LANES	1	1	0	0	0	0	0	1	1	1	0	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	453	1583	0	1770

Phasing Parameters

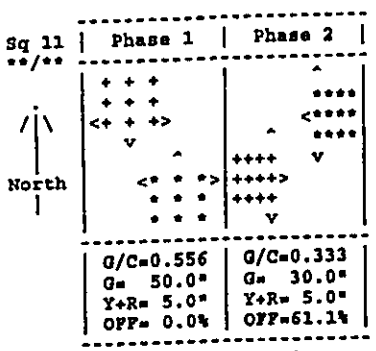
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	60	60		PEDTIME	0.0	0
GREENTIMES	38.00	12.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:25:49

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.61 Vehicle Delay 19.2 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @c (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								18.7	B	
SB Approach										
RT+TH+LT	12/1	0.408	0.556	814	907	545	0.601	18.7	B	491 ft
NB Approach								17.1	B	
RT+TH+LT	12/1	0.444	0.556	944	1001	712	0.711	17.1	*B	592 ft
WB Approach								24.9	C+	
RT+TH+LT	12/1	0.250	0.333	432	545	278	0.510	24.9	*C+	261 ft
EB Approach								21.2	C+	
RT+TH+LT	12/1	0.153	0.333	362	466	72	0.155	21.2	C+	60 ft

Hawaiian Homelands Subdivisions at Waiohuli
Year 2007 excluding other developments, with project
AM Peak Hour of Traffic

05/01/04
14:25:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS			0.0	0.0
GRADES	0.0	0.0	0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

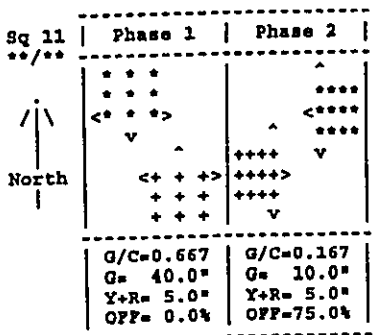
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	35	405	50	220	25	5	5	610	25	20	10	35
VOLUMES	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
WIDTHS	0	1	0	0	1	0	0	1	0	0	1	0
LANES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	2	2	2	3	3	3	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	0	1633	0	0	1635	0	0	1803	0	0	1397	0
SATURATIONFLOWS												

Phasing Parameters

SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	180	90				
GREENTIMES	50.00	30.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	5					
EXCESS	0						

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.54 Vehicle Delay 10.2 Level of Service B+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								10.9	B+	
|RT+TH+LT|	12/1	0.480	0.667	979	1013	673	0.664	10.9	*B+	412 ft
NB Approach								4.9	A	
|RT+TH+LT|	12/1	0.324	0.667	1194	1198	517	0.432	4.9	A	195 ft
WB Approach								23.5	C+	
|RT+TH+LT|	12/1	0.107	0.167	205	272	117	0.430	23.5	*C+	86 ft
EB Approach								22.3	C+	
|RT+TH+LT|	12/1	0.071	0.167	182	243	61	0.249	22.3	C+	43 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Paramater Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	35	455	115	85	15	5	5	440	20	10	15	30
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
LANES	0	1	0	0	1	0	0	1	0	0	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1520	0	0	1634	0	0	1797	0	0	1471	0

Phasing Parameters

SEQUENCES	11	11						
PERMISSIVES	NO	NO	NO	NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1
CYCLES	60	60	60			PEDTIME	0.0	0
GREENTIMES	40.00	10.00						
YELLOWTIMES	5.00	5.00						
CRITICALS	2	5						
EXCESS	0							

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information		
Analyst	MN	Jurisdiction/Date	KULA, MAUI	5/3/2004
Agency or Company	ATA	Major Street	KULA HWY	
Analysis Period/Year	AM PEAK 2007	Minor Street	KEKAULIKE AVE	
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	50	205			285	15				30		85
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	228			317	17				33		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
EB	1								
	2								
	3								
WB	1	LR	127	594	.214	1	12.7	B	12.7
	2								B
	3								
		①	56	1220	.046	<1	8.1	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information		
Analyst	MN	Jurisdiction/Date	KULA, MAUI	5/1/2004
Agency or Company	ATA	Major Street	KULA HWY	
Analysis Period/Year	PM PEAK 2007	Minor Street	KEKAULIKE AVE	
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ			

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	55	210			270	20				25		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	233			300	22				28		39
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	LR	67	541	.124	<1	12.6	B	12.6
	2								B
	3								
		①	61	1232	.05	<1	8.1	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	PUEO DR
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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	25	5	230		30		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		217	28	6	256		33		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
EB	1	LR	39	558	.07	<1	11.9	B	11.9
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1316	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	PUEO DR
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		200	30	5	250		10		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		222	33	6	278		11		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
EB	1	LR	17	582	.029	<1	11.4	B	11.4
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1304	.004	<1	7.8	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/3/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	WAIOHULI LOT 134 ROADWAY
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		200	5	5	235		5		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		222	6	6	261		6		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
EB	1	LR	12	640	.019	<1	10.7	B	10.7
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1335	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/3/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	WAIOHULI LOT 134 ROADWAY
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		200	5	5	250		5		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		222	6	6	278		6		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
EB	1	LR	12	631	.019	<1	10.8	B	10.8
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1335	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	LAUIE DR
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		150	55	5	165		65		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		167	61	6	183		72		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
EB	1	LR	78	621	.126	<1	11.6	B	11.6
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1335	.004	<1	7.7	A	

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 5/1/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	LAUIE DR
Comment	YEAR 2007 EXCL OTHER DEVELOP W/PROJ		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		125	70	5	215		45		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		139	78	6	239		50		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
EB	1	LR	56	600	.093	<1	11.6	B	11.6
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1347	.004	<1	7.7	A	

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CIVIL ENGINEERS • SURVEYORS

APPENDIX C
LEVEL OF SERVICE CALCULATIONS

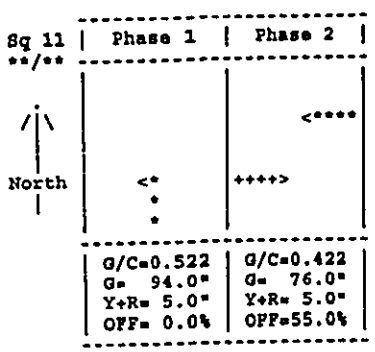
- Year 2007 Scenario B,
  With The Project

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:16:21

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.92 Vehicle Delay 79.8 Level of Service E



C=180 sec G=170.0 sec = 94.4% Y=10.0 sec = 5.6% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								78.2	E	
LT	12/1	0.620	0.522	652	924	944	1.022	78.2	*E	2134 ft
WB Approach								93.7	F	
TH	24/2	0.615	0.422	26	1477	1550	1.037	93.7	*F	1895 ft
EB Approach								34.5	C	
TH	24/2	0.418	0.422	490	1494	444	0.297	34.5	C	342 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:16:32

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	0	0	0	0	1395	0	5	0	850	295	400	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

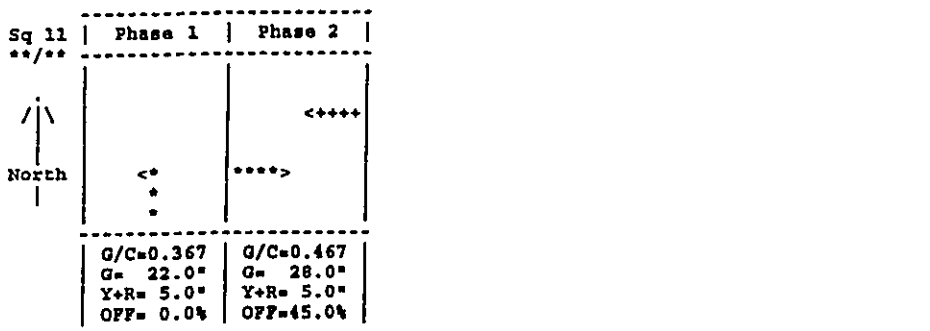
Phasing Parameters

SEQUENCES	11	11				
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	180	180	60		PEDTIME	0.0 0
GREENTIMES	94.00	76.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	9	5				
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
PM Peak Hour of Traffic 10:20:03
Future Year 2007 with Project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.67 Vehicle Delay 15.3 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								18.3	B	
LT	12/1	0.281	0.367	591	649	428	0.659	18.3	*B	288 ft
WB Approach								14.7	B+	
TH	24/2	0.297	0.467	1608	1652	972	0.588	14.7	B+	333 ft
EB Approach								14.8	B+	
TH	24/2	0.359	0.467	1632	1652	1217	0.737	14.8	*B+	416 ft

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
PM Peak Hour of Traffic 10:20:10
Future Year 2007 with Project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	875	0	5	0	385	710	1095	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

Phasing Parameters

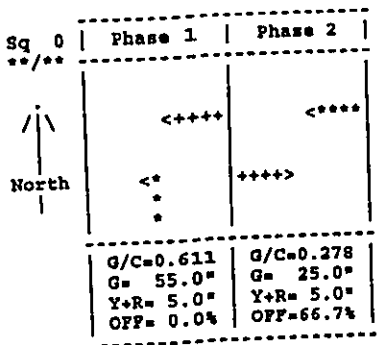
SEQUENCES	11	11						
PERMISSIVES	YES	YES	YES	YES	LEADLAGS	NONE	NONE	
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1	
CYCLES	60	180	60		PEDTIME	0.0	0	
GREENTIMES	22.00	28.00						
YELLOWTIMES	5.00	5.00						
CRITICALS	9	11						
EXCESS	0							

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:15:14

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.58 Vehicle Delay 11.4 Level of Service B+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								22.7	C+	
NB Approach										
LT	12/1	0.565	0.611	1039	1081	944	0.873	22.7	*C+	913 ft
								0.1	A	
WB Approach										
TH	24/2	0.477	1.000	3539	3539	1550	0.438	0.1	*A	35 ft
								27.2	C+	
EB Approach										
TH	24/2	0.198	0.278	788	983	444	0.452	27.2	C+	225 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:15:26

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD											
SIMULATION PERIOD	15											
LEVELOFSERVICE	C	S										
NODELOCATION	0	0										
QUEUEMODELS	1	90	25	40								

Approach Parameters	SB			WB			NB			EB		
APPLABELS	0.0			0.0			0.0			0.0		
GRADES	0			0			0			0		
PEDLEVELS	0			0			0			0		
BIKEVOLUMES	0			NONE			NONE			NONE		
PARKINGSIDES	NONE			20			20			20		
PARKVOLUMES	20			0			0			0		
BUSVOLUMES	0			0			0			0		
RIGHTTURNONREDS	0			0			0			0		
UPSTREAMVC	0.00			0.00			0.00			0.00		

Movement Parameters	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	0	0	0	0	1395	0	5	0	850	295	400	0
VOLUMES	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
WIDTHS	0	0	0	0	2	0	1	0	1	1	2	0
LANES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	3	3	3	2	2	2	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	0	0	0	0	3539	0	0	0	1770	0	3539	0
SATURATIONFLOWS												

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:15:26

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

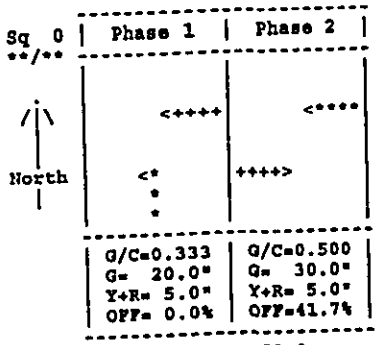
SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	90	180	90							
GREENTIMES	55.00	25.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:18:22

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Old Haleakal
Degree of Saturation (v/c) 0.54 Vehicle Delay 9.5 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
								22.0	C+	
NB Approach										
LT	12/1	0.281	0.333	528	590	428	0.725	22.0	*C+	308 ft
								0.0	A	
WB Approach										
TH	24/2	0.297	1.000	3539	3539	972	0.275	0.0	*A	13 ft
								12.6	B+	
EB Approach										
TH	24/2	0.359	0.500	1761	1770	1217	0.688	12.6	B+	386 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Old Haleakal

METROAREA	NONCBD
SIMULATION PERIOD	15
LEVELOFSERVICE	C S
NODELOCATION	0 0
QUEUEMODELS	1 90 25 40

Approach Parameters	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters												
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	875	0	5	0	385	710	1095	0
WIDTHS	0.0	0.0	0.0	0.0	24.0	0.0	12.0	0.0	12.0	12.0	24.0	0.0
LANES	0	0	0	0	2	0	1	0	1	1	2	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
PFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	3539	0	0	0	1770	0	3539	0

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:18:30

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters										
SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	YES	YES	YES	YES				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	180	60							
GREENTIMES	20.00	30.00								
YELLOWTIMES	5.00	5.00								
CRITICALS	9	5								
EXCESS	0									
PHASEMOVEMENTS	1	9	5	0	0	0	0			
PHASEMOVEMENTS	2	5	11	0	0	0	0			
PHASEMOVEMENTS	3	0	0	0	0	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

HCS2000: Ramps and Ramp Junctions Release 4.1d

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TL
Agency/Co.:	ATA
Date performed:	1/8/2004
Analysis time period:	AM peak
Freeway/Dir of Travel:	Haleakala Highway/westbound
Junction:	west of HH/OHH western int
Jurisdiction:	Maui
Analysis Year:	Year 2007 with Project
Description:	Hawaiian Home Lands Subdivisions

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	1395	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	850	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1395	850		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	388	236		v
Trucks and buses	0	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	1.000	1.000		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	1550	944		pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)

P_{FM}^{EQ} = 1.000 Using Equation 0

$v_{12} = v_{P}\ (P_{FM}) = 1550$ pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2494	4500	No
v_{R12}	2680	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A = 21.4$ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.343	
Space mean speed in ramp influence area,	S_R = 50.5	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 50.5	mph

HCS2000: Ramps and Ramp Junctions Release 4.1d

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TL
Agency/Co.:	ATA
Date performed:	1/8/2004
Analysis time period:	PM peak
Freeway/Dir of Travel:	Haleakala Highway/westbound
Junction:	west of HH/OHH western int
Jurisdiction:	Maui
Analysis Year:	Year 2007 with Project
Description:	Hawaiian Home Lands Subdivisions

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	2	
Free-flow speed on freeway	55.0	mph
Volume on freeway	875	vph

On Ramp Data

Side of freeway	Left	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	875	385		vph
Peak-hour factor, PHF	0.90	0.90		
Peak 15-min volume, v15	243	107		v
Trucks and buses	0	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		
Heavy vehicle adjustment, fHV	1.000	1.000		
Driver population factor, fP	1.00	1.00		
Flow rate, vp	972	428		pcph

Estimation of V12 Merge Areas

L = (Equation 25-2 or 25-3)

P_{FM}^{EQ} = 1.000 Using Equation 0

$v_{12} = v_R (P_{FM})$ = 972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	1400	4500	No
v_{R12}	1516	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\ v_R + 0.0078\ v_{12} - 0.00627\ L_A$ = 13.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.304	
Space mean speed in ramp influence area,	S_R = 51.1	mph
Space mean speed in outer lanes,	S_O = N/A	mph
Space mean speed for all vehicles,	S = 51.1	mph

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:08:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.54 Vehicle Delay 21.6 Level of Service C+

Sq 11 **/**

Phase 1	Phase 2
G/C=0.422	G/C=0.467
G= 38.0*	G= 42.0*
Y+R= 5.0*	Y+R= 5.0*
OFF= 0.0%	OFF=47.8%

North

C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								22.1	C+	
SB Approach										
RT	12/1	0.344	0.422	559	669	406	0.607	24.3	*C+	366 ft
TH+LT	12/1	0.262	0.422	517	604	256	0.424	18.8	B	211 ft
								16.4	B	
NB Approach										
RT	12/1	0.189	0.422	559	669	106	0.158	16.6	B	84 ft
TH+LT	12/1	0.160	0.422	651	745	117	0.157	16.2	B	86 ft
								24.7	C+	
WB Approach										
RT+TH	24/2	0.389	0.467	1498	1640	1189	0.725	24.9	*C+	621 ft
LT	12/1	0.137	0.467	340	424	22	0.052	15.8	B	18 ft
								15.0	B+	
EB Approach										
RT+TH	24/2	0.192	0.467	1563	1648	417	0.253	14.6	B+	155 ft
LT	12/1	0.225	0.467	62	83	39	0.419	19.0	B	35 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:08:45

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS	0.0	0.0	0.0	0.0
GRADES	0	0	0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	365	105	125	50	1020	20	95	90	15	5	370	35
VOLUMES	12.0	12.0	0.0	0.0	24.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
WIDTHS	1	1	0	0	2	1	1	1	0	0	2	1
LANES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	3	3	3	2	2	2	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1583	1430	0	0	3514	909	1583	1764	0	0	3532	199
SATURATIONFLOWS												

Phasing Parameters

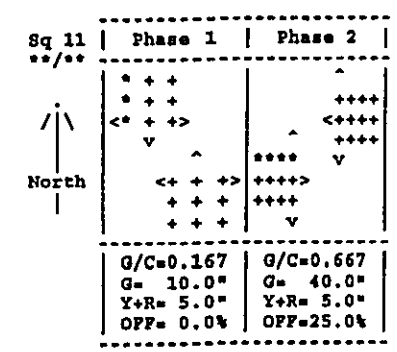
SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	90	180	90				
GREENTIMES	38.00	42.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	1	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:10:12

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makani Road
Degree of Saturation (v/c) 0.41 Vehicle Delay 8.2 Level of Service A



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								24.2	C+	
RT	12/1	0.115	0.167	171	264	94	0.356	25.9	*C+	74 ft
TH+LT	12/1	0.076	0.167	226	296	83	0.280	22.4	C+	59 ft
NB Approach								22.4	C+	
RT	12/1	0.059	0.167	171	264	28	0.106	22.0	C+	22 ft
TH+LT	12/1	0.082	0.167	233	304	95	0.313	22.6	C+	68 ft
WB Approach								7.1	A	
RT+TH	24/2	0.291	0.667	2347	2347	944	0.402	7.2	A	258 ft
LT	12/1	0.000	0.667	280	320	39	0.122	5.8	A	19 ft
EB Approach								5.3	A	
RT+TH	24/2	0.307	0.667	2356	2356	1017	0.432	4.8	A	202 ft
LT	12/1	0.468	0.667	285	317	183	0.577	8.0	*A	90 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:10:20

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makani Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	85	65	10	30	820	35	25	80	5	10	905	165
WIDTHS	12.0	12.0	0.0	0.0	24.0	12.0	12.0	12.0	0.0	0.0	24.0	12.0
LANES	1	1	0	0	2	1	1	1	0	0	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1775	0	0	3521	479	1583	1825	0	0	3533	476

Phasing Parameters

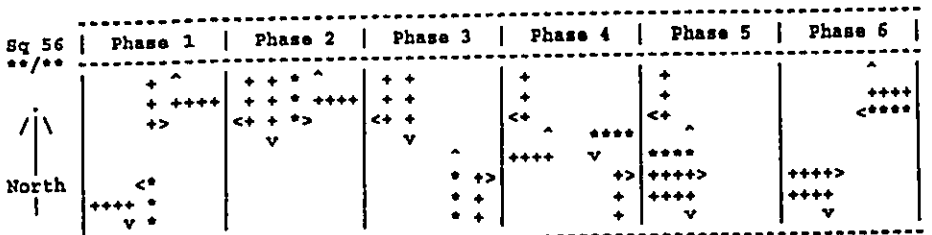
SEQUENCES	11	11				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	60	180	60		PEDTIME	0.0 0
GREENTIMES	10.00	40.00				
YELLOWTIMES	5.00	5.00				
CRITICALS	1	12				
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:11:58

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.64 Vehicle Delay 34.9 Level of Service C



C= 90 sec G= 60.0 sec = 66.7% Y=30.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								32.1	C	
RT	12/1	0.296	0.511	729	809	311	0.384	14.8	B+	226 ft
TH	12/1	0.268	0.289	405	538	361	0.671	31.5	C	373 ft
LT	12/1	0.273	0.233	272	413	350	0.847	48.1	*D	423 ft
NB Approach								46.2	D	
RT	12/1	0.128	0.222	168	348	11	0.031	27.6	C	12 ft
TH	12/1	0.166	0.111	1	190	144	0.696	48.3	*D	176 ft
LT	12/1	0.132	0.056	1	80	39	0.398	43.7	*D+	47 ft
WB Approach								37.6	D+	
RT	12/1	0.307	0.556	774	880	311	0.353	15.7	B	258 ft
TH	24/2	0.303	0.267	710	944	856	0.907	45.5	*D	565 ft
LT	12/1	0.120	0.056	1	80	6	0.061	40.5	*D+	7 ft
EB Approach								31.0	C	
RT	12/1	0.169	0.489	650	774	72	0.093	15.3	B	64 ft
TH	24/2	0.175	0.378	1155	1337	344	0.257	21.7	C+	167 ft
LT	12/1	0.217	0.167	137	285	233	0.790	49.5	*D	289 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:12:11

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters												
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	280	325	315	280	770	5	10	130	35	65	310	210
WIDTHS	12.0	12.0	12.0	12.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	2	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	1583	3539	1770	1583	1863	1770	1583	3539	1770

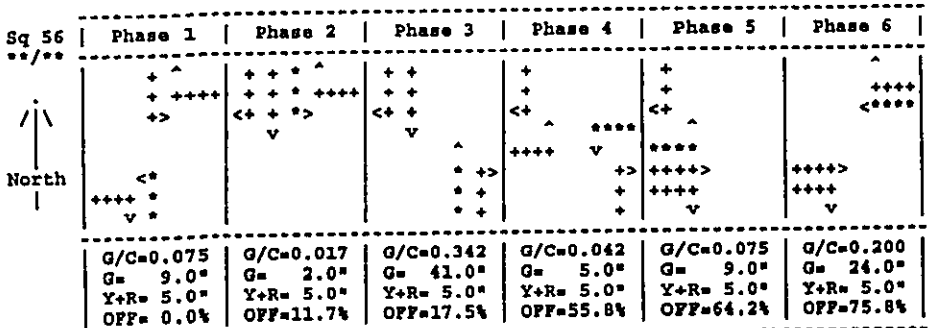
Phasing Parameters								
SEQUENCES	56	56						
PERMISSIVES	NO	NO	NO	NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1
CYCLES	90	180	90			PEDTIME	0.0	0
GREENTIMES	5.00	11.00	10.00	5.00	5.00	24.00		
YELLOWTIMES	5.00	5.00	5.00	5.00	5.00	5.00		
CRITICALS	9	3	8	6	12	5		
EXCESS	0							

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:13:15

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Haleakala Highway/Makawao Aven
Degree of Saturation (v/c) 0.70 Vehicle Delay 52.2 Level of Service D



C=120 sec G= 90.0 sec = 75.0% Y=30.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								35.1	D+	
RT	12/1	0.301	0.600	863	950	172	0.181	11.2	B+	129 ft
TH	12/1	0.335	0.400	557	745	378	0.507	27.7	C	423 ft
LT	12/1	0.284	0.133	1	208	194	0.822	70.9	*E	321 ft
NB Approach								67.3	E+	
RT	12/1	0.245	0.425	483	673	22	0.033	20.2	C+	23 ft
TH	12/1	0.425	0.342	398	636	622	0.978	69.1	*E	1015 ft
LT	12/1	0.258	0.075	1	105	89	0.669	66.3	*E+	147 ft
WB Approach								63.0	E+	
RT	12/1	0.381	0.375	293	594	306	0.515	35.6	D+	389 ft
TH	24/2	0.351	0.200	1	703	689	0.973	75.2	*E	639 ft
LT	12/1	0.252	0.042	1	51	11	0.149	56.4	*E+	18 ft
EB Approach								43.3	D+	
RT	12/1	0.340	0.433	427	686	211	0.308	27.1	C+	249 ft
TH	24/2	0.331	0.317	475	1121	572	0.510	36.3	D+	396 ft
LT	12/1	0.322	0.158	1	254	244	0.871	73.8	*E	410 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:13:38

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Haleakala Highway/Makawao Aven

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	155	340	175	275	620	10	20	560	80	190	515	220
WIDTHS	12.0	12.0	12.0	12.0	24.0	12.0	12.0	12.0	12.0	12.0	24.0	12.0
LANES	1	1	1	1	2	1	1	1	1	1	2	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	2	2	2	3	3	3	2	2	2
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	1770	1583	3539	1770	1583	1863	1770	1583	3539	1770

Phasing Parameters

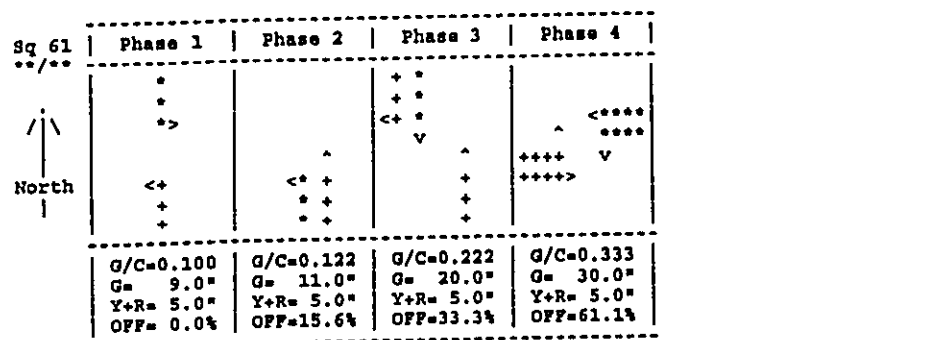
SEQUENCES	56	56						
PERMISSIVES	NO	NO	NO	NO		LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1
CYCLES	120	120	90			PEDTIME	0.0	0
GREENTIMES	9.00	2.00	41.00	5.00	9.00	24.00		
YELLOWTIMES	5.00	5.00	5.00	5.00	5.00	5.00		
CRITICALS	9	3	8	6	12	5		
EXCESS	0							

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
08:54:34

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.68 Vehicle Delay 32.0 Level of Service C



C= 90 sec G= 70.0 sec = 77.8% Y=20.0 sec = 22.2% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								38.8	D+	
RT	12/1	0.123	0.222	160	347	6	0.017	27.9	C	7 ft
TH	24/2	0.241	0.222	533	786	606	0.771	38.2	*D+	373 ft
LT	12/1	0.154	0.100	1	159	100	0.565	42.8	*D+	121 ft
NB Approach								29.8	C	
TH	24/2	0.332	0.400	1244	1416	972	0.686	26.8	C+	518 ft
LT	12/1	0.292	0.278	345	492	372	0.756	37.8	*D+	419 ft
WB Approach								30.9	C	
TH+LT	12/1	0.312	0.333	337	438	306	0.699	30.9	*C	321 ft
EB Approach								22.4	C+	
TH+LT	12/1	0.182	0.333	494	614	178	0.290	22.4	C+	153 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
08:54:48

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90	25 40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	545	90	170	125	150	160	875	335	565	155	5
WIDTHS	12.0	24.0	12.0	12.0	12.0	0.0	12.0	24.0	12.0	12.0	12.0	0.0
LANES	1	2	1	1	1	0	1	2	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	3539	1770	0	1314	0	0	3539	1770	0	1841	0

Phasing Parameters

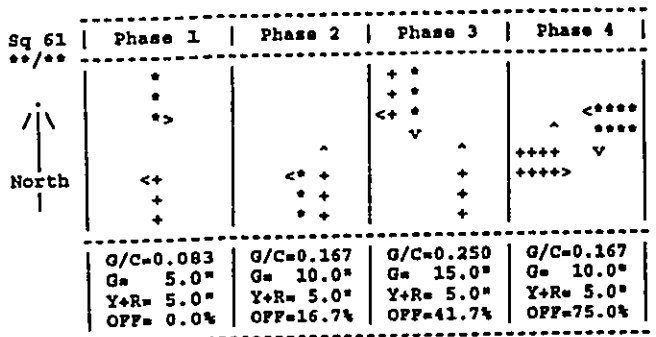
SEQUENCES	61	61				
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00 1
CYCLES	90	180	90		PEDTIME	0.0 0
GREENTIMES	9.00	11.00	20.00	30.00		
YELLOWTIMES	5.00	5.00	5.00	5.00		
CRITICALS	3	9	2	5		
EXCESS	0					

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
09:25:59

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Highway/Haleakala Highway
Degree of Saturation (v/c) 0.69 Vehicle Delay 24.0 Level of Service C+



C= 60 sec G= 40.0 sec = 66.7% Y=20.0 sec = 33.3% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								29.7	C	
RT	12/1	0.027	0.250	305	396	6	0.015	17.6	B	5 ft
TH	24/2	0.237	0.250	800	885	750	0.847	29.9	*C	337 ft
LT	12/1	0.068	0.083	93	137	72	0.490	28.8	*C	60 ft
NB Approach								20.1	C+	
TH	24/2	0.289	0.500	1735	1770	944	0.533	13.0	B+	310 ft
LT	12/1	0.329	0.333	520	590	511	0.866	33.2	*C	427 ft
WB Approach								30.3	C	
TH+LT	12/1	0.155	0.167	190	254	172	0.675	30.3	*C	139 ft
EB Approach								22.8	C+	
TH+LT	12/1	0.090	0.167	233	304	106	0.349	22.8	C+	76 ft

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
09:26:08

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Highway/Haleakala Highway

METROAREA	NONCBD	
SIMULATION PERIOD	15	
LEVELOFSERVICE	C	S
NODELOCATION	0	0
QUEUEMODELS	1 90 25 40	

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	5	675	65	80	80	75	65	850	460	430	90	5
WIDTHS	12.0	24.0	12.0	12.0	12.0	0.0	12.0	24.0	12.0	12.0	12.0	0.0
LANES	1	2	1	1	1	0	1	2	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM	FFLW	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	2	2	2	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	3539	1770	0	1527	0	0	3539	1770	0	1824	0

Phasing Parameters

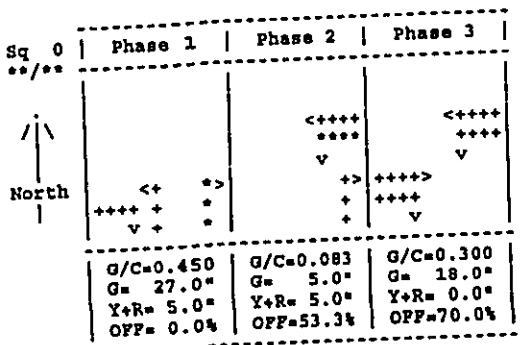
SEQUENCES	61	61			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	60	180	60				
GREENTIMES	5.00	10.00	15.00	10.00			
YELLOWTIMES	5.00	5.00	5.00	5.00			
CRITICALS	3	9	2	5			
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:41:56

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.59 Vehicle Delay 17.9 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								15.5	B	
NB Approach										
RT	12/1	0.293	0.617	955	976	383	0.392	7.0	*A	166 ft
LT	12/1	0.395	0.450	750	796	644	0.809	20.5	C+	458 ft
								27.0	C+	
WB Approach										
TH	12/1	0.185	0.383	658	714	272	0.381	13.7	B+	156 ft
LT	12/1	0.085	0.083	386	439	389	0.886	36.3	*D+	338 ft
								9.0	A	
EB Approach										
RT	12/1	0.216	0.750	1188	1188	250	0.210	2.6	A	71 ft
TH	12/1	0.109	0.217	332	404	139	0.344	20.4	C+	95 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:42:16

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS	0	0	0	0	245	350	345	0	580	225	125	0
VOLUMES	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
WIDTHS	0	0	0	0	1	1	1	0	1	1	1	0
LANES	NORM	NORH	NORM	NORM	NORH	NORM	NORM	NORM	NORM	NORM	NORM	NORM
GROUPTYPES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
UTILIZATIONS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TRUCKPERCENTS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PEAKHOURFACTORS	3	3	3	3	3	3	3	3	3	3	3	3
ARRIVALTYPES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
ACTUATIONS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	0	0	0	0	0	0	0	0	0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
IDEALSATFLOWS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0
SATURATIONFLOWS												

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:42:16

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

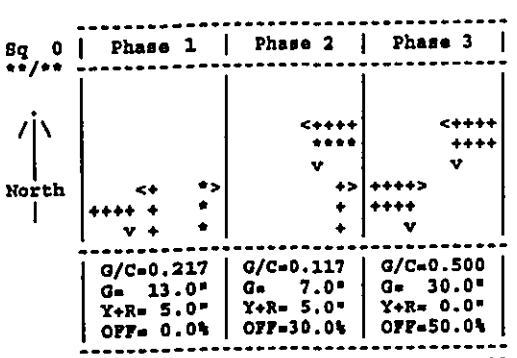
Phasing Parameters										
SEQUENCES	0	0								
PERMISSIVES	YES	YES	YES	YES				LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES				OFFSET	0.00	1
CYCLES	60	120	10					PEDTIME	0.0	0
GREENTIMES	27.00	5.00	18.00							
YELLOWTIMES	5.00	5.00	0.00							
CRITICALS	7	6	2							
EXCESS	0									
PHASEMOVEMENTS	1	7	9	10	0	0	0			
PHASEMOVEMENTS	2	6	7	5	0	0	0			
PHASEMOVEMENTS	3	5	10	11	-6	0	0			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:43:13

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Hwy/Pukalani St
Degree of Saturation (v/c) 0.66 Vehicle Delay 23.4 Level of Service C+



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
NB Approach								27.5	C	
RT	12/1	0.351	0.417	600	660	483	0.732	21.7	*C+	338 ft
LT	12/1	0.220	0.217	312	383	317	0.828	36.4	D+	270 ft
WB Approach								34.3	C	
TH	12/1	0.163	0.617	1136	1149	233	0.203	5.1	A	83 ft
LT	12/1	0.129	0.117	614	643	639	0.994	44.9	*D+	642 ft
EB Approach								7.4	A	
RT	12/1	0.373	0.717	1135	1135	522	0.460	4.9	A	193 ft
TH	12/1	0.185	0.417	725	776	272	0.351	12.2	B+	147 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Hwy/Pukalani St

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1 90 25 40			

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	0	0	0	0	210	575	435	0	285	470	245	0
WIDTHS	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	12.0	12.0	12.0	0.0
LANES	0	0	0	0	1	1	1	0	1	1	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	0	0	0	1863	1770	1583	0	1770	1583	1863	0

Hawaiian Homelands Subdivisions at Waiohuli 04/27/04
PM Peak Hour of Traffic 10:43:20
Future Year 2007 with Project

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

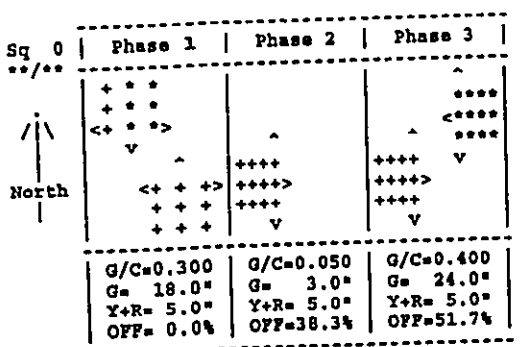
SEQUENCES	0	0							
PERMISSIVES	YES	YES	YES	YES		LEADLAGS	NONE	NONE	
OVERLAPS	YES	YES	YES	YES		OFFSET	0.00	1	
CYCLES	60	120	10			PEDTIME	0.0	0	
GREENTIMES	13.00	7.00	30.00						
YELLOWTIMES	5.00	5.00	0.00						
CRITICALS	7	6	2						
EXCESS	0								
PHASEMOVEMENTS	1	7	9	10	0	0	0		
PHASEMOVEMENTS	2	6	7	5	0	0	0		
PHASEMOVEMENTS	3	5	10	11	-6	0	0		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:21:36

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Hakawao
Degree of Saturation (v/c) 0.62 Vehicle Delay 18.6 Level of Service B



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Pad= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								20.5	C+	
SB Approach										
RT	12/1	0.222	0.300	395	475	261	0.549	22.1	C+	184 ft
TH+LT	12/1	0.135	0.300	291	350	105	0.300	16.6	*B	66 ft
								25.7	C+	
NB Approach										
RT+TH+LT	12/1	0.268	0.300	426	491	372	0.758	25.7	C+	284 ft
								23.2	C+	
WB Approach										
RT+TH+LT	12/1	0.358	0.400	584	638	512	0.803	23.2	*C+	380 ft
								9.5	A	
EB Approach										
RT+TH	12/1	0.328	0.533	957	987	544	0.551	9.9	A	284 ft
LT	12/1	0.084	0.533	913	944	94	0.100	6.9	A	37 ft

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:21:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Hakawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	0	0	0	0
PARKVOLUMES	NONE	NONE	NONE	NONE
BUSVOLUMES	20	20	20	20
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0	0	0	0
	0.00	0.00	0.00	0.00

Movement Parameters												
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	235	40	55	70	330	60	225	80	30	20	470	85
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1168	0	0	1595	0	0	1638	0	0	1851	1770

Hawaiian Homelands Subdivisions at Waiohuli
AM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:21:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

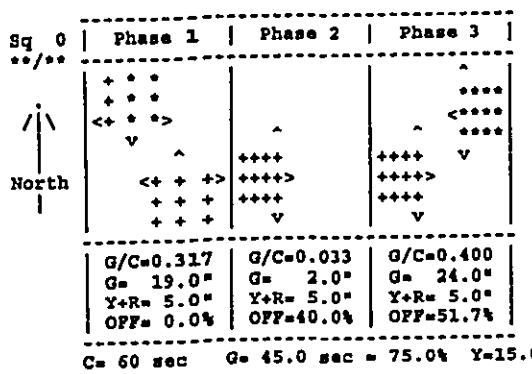
Phasing Parameters									
SEQUENCES	0	0							
PERMISSIVES	NO	NO	NO	NO			LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES			OFFSET	0.00	1
CYCLES	90	180	90				PEDTIME	0.0	0
GREENTIMES	18.00	3.00	24.00						
YELLOWTIMES	5.00	5.00	5.00						
CRITICALS	2	6	5						
EXCESS	0								
PHASEMOVEMENTS	1	1	2	3	7	8	9		
PHASEMOVEMENTS	2	10	11	12	0	0	0		
PHASEMOVEMENTS	3	4	5	6	10	11	12		
PHASEMOVEMENTS	4	0	0	0	0	0	0		
PHASEMOVEMENTS	5	0	0	0	0	0	0		
PHASEMOVEMENTS	6	0	0	0	0	0	0		

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:41:01

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Old Haleakala Highway/Makawao
Degree of Saturation (v/c) 0.63 Vehicle Delay 22.4 Level of Service C+



C= 60 sec G= 45.0 sec = 75.0% Y=15.0 sec = 25.0% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								28.2	C	
RT	12/1	0.307	0.317	423	501	406	0.810	32.1	C	330 ft
TH+LT	12/1	0.124	0.317	418	480	128	0.267	15.6	*B	77 ft
NB Approach								15.5	B	
RT+TH+LT	12/1	0.115	0.317	471	535	133	0.249	15.5	B	79 ft
WB Approach								36.0	D+	
RT+TH+LT	12/1	0.402	0.400	624	678	628	0.926	36.0	*D+	545 ft
EB Approach								9.5	A	
RT+TH	12/1	0.284	0.517	919	952	455	0.478	9.7	A	231 ft
LT	12/1	0.250	0.517	880	914	372	0.407	9.2	A	181 ft

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Old Haleakala Highway/Hakawao

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS	0.0	0.0	0.0	0.0
GRADES	0	0	0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	365	60	55	70	445	50	35	65	20	30	380	335
WIDTHS	12.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	12.0
LANES	1	1	0	0	1	0	0	1	0	0	1	1
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	3	3	3	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1517	0	0	1695	0	0	1691	0	0	1842	1770

Hawaiian Homelands Subdivisions at Waiohuli
PM Peak Hour of Traffic
Future Year 2007 with Project

04/27/04
10:41:08

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Phasing Parameters

SEQUENCES	0	0						LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO				OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES				PEDTIME	0.0	0
CYCLES	60	120	10							
GREENTIMES	19.00	2.00	24.00							
YELLOWTIMES	5.00	5.00	5.00							
CRITICALS	2	6	5							
EXCESS	0									
PHASEMOVEMENTS	1	1	2	3	7	8	9			
PHASEMOVEMENTS	2	10	11	12	0	0	0			
PHASEMOVEMENTS	3	4	5	6	10	11	12			
PHASEMOVEMENTS	4	0	0	0	0	0	0			
PHASEMOVEMENTS	5	0	0	0	0	0	0			
PHASEMOVEMENTS	6	0	0	0	0	0	0			

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	AM Peak 2007
Comment	Year 2007 with Project

Site Information

Jurisdiction/Date	Jurisdiction 5/3/2004
Major Street	Kuta Highway
Minor Street	King Kekaulike School

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	T	T		LT
Lane 3	L	LT		
Lane 4				
Lane 5				

	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)	230	995	5	5	1220	140	5	0	5	20	0	125
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	256	1106	6	6	1356	156	6	0	6	22	0	139
Flare storage (# of vehs)												0
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

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	LTR	12	15	0.789	2	487.6	F	487.6
	2								F
	3								
WB	1	R	139	392	0.354	2	19.1	C	204.1
	2	LT	22	10	2.313	4	1372.9	F	F
	3								
SB		①	256	498	0.513	3	19.6	C	
NB		④	6	618	0.009	0	10.9	B	

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kingk - kingK_am
Tof 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	PM Peak 2007
Comment	Year 2007 with Project

Site Information

Jurisdiction/Date	Jurisdiction 5/3/2004
Major Street	Kuta Highway
Minor Street	King Kekaulike School

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	R	LTR	R
Lane 2	T	T		LT
Lane 3	L	LT		
Lane 4				
Lane 5				

	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)	5	1175	20	5	1320	5	5	0	5	10	0	30
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	6	1306	22	6	1467	6	6	0	6	11	0	33
Flare storage (# of vehs)												0
Median storage (# of vehs)												

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 0.25

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	LTR	12	51	0.234	1	95.4	F	95.4
	2								F
	3								
WB	1	R	33	361	0.091	0	16.0	C	66.4
	2	LT	11	26	0.418	1	217.8	F	F
	3								
SB		①	6	451	0.012	0	13.1	B	
NB		④	6	511	0.011	0	12.1	B	

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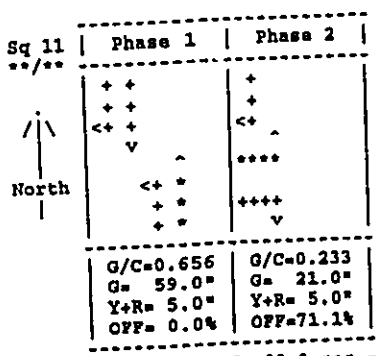
kingk - kingK_pm
Tof 1

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
AM Peak Hour of Traffic

04/27/04
08:49:21

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.60 Vehicle Delay 15.9 Level of Service B



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E (vph)	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
								5.9	A	
SB Approach										
RT	12/1	0.463	1.000	1583	1583	600	0.379	0.7	A	46 ft
TH	12/1	0.366	0.656	1148	1221	544	0.446	11.7	B+	421 ft
								18.5	B	
NB Approach										
TH	12/1	0.600	0.656	1192	1221	1072	0.878	20.1	*C+	1001 ft
LT	12/1	0.349	0.656	387	428	161	0.376	7.6	A	93 ft
								31.1	C	
EB Approach										
RT	12/1	0.182	0.233	189	368	94	0.255	29.8	C	98 ft
LT	24/2	0.203	0.233	578	801	450	0.562	31.3	*C	242 ft

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
AM Peak Hour of Traffic

04/27/04
08:49:38

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters	SB	WB	NB	EB
APPLABELS			0.0	0.0
GRADES	0.0	0.0	0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters												
MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	540	490	0	0	0	0	0	965	145	85	0	405
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	24.0
LANES	1	1	0	0	0	0	0	1	1	1	0	2
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	652	1583	0	3433

Phasing Parameters							
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	59.00	21.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	12					
EXCESS	0						

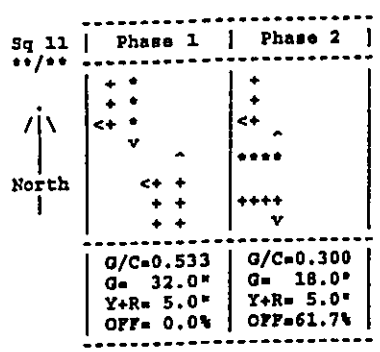
Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
PM Peak Hour of Traffic

04/27/04
08:50:46

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/A'Apueo Pkwy
Degree of Saturation (v/c) 0.68 Vehicle Delay 16.7 Level of Service B

Sq 11 **/**



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	Service Rate @E	Adj Volume	v/c	HCM Delay	LOS	Queue Model 1
SB Approach								15.5	B	
RT	12/1	0.337	1.000	1583	1583	450	0.284	0.5	A	23 ft
TH	12/1	0.489	0.533	945	993	856	0.862	23.4	*C+	645 ft
NB Approach								12.6	B+	
TH	12/1	0.399	0.533	963	993	689	0.694	12.5	B+	404 ft
LT	12/1	0.017	0.533	95	119	67	0.540	13.9	B+	41 ft
EB Approach								21.9	C+	
RT	12/1	0.131	0.300	395	475	117	0.246	17.1	B	77 ft
LT	24/2	0.253	0.300	961	1030	789	0.766	22.6	*C+	309 ft

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
PM Peak Hour of Traffic

04/27/04
08:51:15

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/A'Apueo Pkwy

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

MOVLABELS	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
VOLUMES	405	770	0	0	0	0	0	620	60	105	0	710
WIDTHS	12.0	12.0	0.0	0.0	0.0	0.0	0.0	12.0	12.0	12.0	0.0	24.0
LANES	1	1	0	0	0	0	0	1	1	1	0	2
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	1583	1863	0	0	0	0	0	1863	233	1583	0	3433

Phasing Parameters

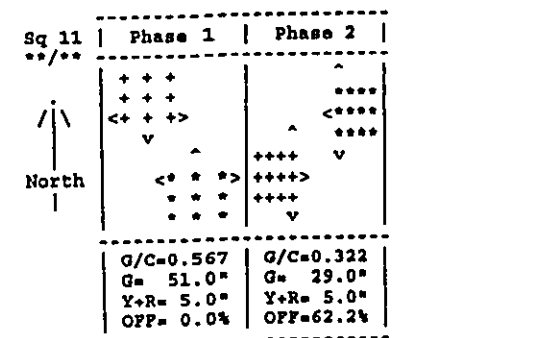
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	60	180	60		PEDTIME	0.0	0
GREENTIMES	32.00	18.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	12					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
AM Peak Hour of Traffic

04/27/04
09:31:11

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.67 Vehicle Delay 20.4 Level of Service C+



C= 90 sec G= 80.0 sec = 88.9% Y=10.0 sec = 11.1% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								19.3	B	
RT+TH+LT	12/1	0.435	0.567	835	925	594	0.642	19.3	B	542 ft
NB Approach								18.5	B	
RT+TH+LT	12/1	0.479	0.567	968	1022	784	0.767	18.5	*B	682 ft
WB Approach								27.1	C+	
RT+TH+LT	12/1	0.266	0.322	411	526	306	0.582	27.1	*C+	299 ft
EB Approach								22.2	C+	
RT+TH+LT	12/1	0.158	0.322	324	427	77	0.180	22.2	C+	66 ft

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
AM Peak Hour of Traffic

04/27/04
09:31:18

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				
GRADES	0.0	0.0	0.0	0.0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS												
VOLUMES	40	445	50	245	25	5	5	675	25	20	10	40
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0
LANES	0	1	0	0	1	0	0	1	0	0	1	0
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	3	3	3
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
MININUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	0
INITIALQUEUE	0	0	0	0	0	0	0	0	0	0	0	0
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SATURATIONFLOWS	0	1633	0	0	1633	0	0	1804	0	0	1325	0

Phasing Parameters

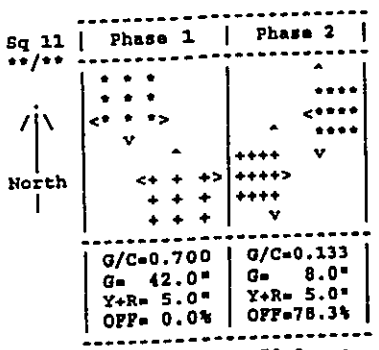
SEQUENCES	11	11					
PERMISSIVES	NO	NO	NO	NO	LEADLAGS	NONE	NONE
OVERLAPS	YES	YES	YES	YES	OFFSET	0.00	1
CYCLES	90	180	90		PEDTIME	0.0	0
GREENTIMES	51.00	29.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	8	5					
EXCESS	0						

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
PM Peak Hour of Traffic

04/27/04
09:32:07

SIGNAL2000/TEAPAC[Ver 1.11.00] - Capacity Analysis Summary

Intersection Averages for Int # 0 - Kula Hwy/Omaopio Road
Degree of Saturation (v/c) 0.69 Vehicle Delay 15.8 Level of Service B



C= 60 sec G= 50.0 sec = 83.3% Y=10.0 sec = 16.7% Ped= 0.0 sec = 0.0%

Lane Group	Width/ Lanes	g/C Reqd	g/C Used	Service Rate @C (vph)	@E	Adj Volume	v/c	HCM Delay	L S	Queue Model 1
SB Approach								20.9	C+	
|RT+TH+LT|	12/1	0.644	0.700	984	1015	895	0.882	20.9	*C+	655 ft
NB Approach								4.3	A	
|RT+TH+LT|	12/1	0.363	0.700	1251	1251	589	0.471	4.3	A	214 ft
WB Approach								28.8	C	
|RT+TH+LT|	12/1	0.116	0.133	154	212	129	0.594	28.8	*C	104 ft
EB Approach								24.5	C+	
|RT+TH+LT|	12/1	0.072	0.133	134	186	61	0.316	24.5	C+	46 ft

Hawaiian Homelands Subdivisions at Waiohuli
Future Year 2007 with Project
PM Peak Hour of Traffic

04/27/04
09:32:15

SIGNAL2000/TEAPAC[Ver 1.11.00] - Summary of Parameter Values

Intersection Parameters for Int # 0 - Kula Hwy/Omaopio Road

METROAREA	NONCBD			
SIMULATION PERIOD	15			
LEVELOFSERVICE	C	S		
NODELOCATION	0	0		
QUEUEMODELS	1	90	25	40

Approach Parameters

	SB	WB	NB	EB
APPLABELS				0.0
GRADES	0.0	0.0	0.0	0
PEDLEVELS	0	0	0	0
BIKEVOLUMES	0	0	0	0
PARKINGSIDES	NONE	NONE	NONE	NONE
PARKVOLUMES	20	20	20	20
BUSVOLUMES	0	0	0	0
RIGHTTURNONREDS	0	0	0	0
UPSTREAMVC	0.00	0.00	0.00	0.00

Movement Parameters

	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
MOVLABELS										10	15	30
VOLUMES	50	595	160	95	15	5	5	505	20	0.0	12.0	0.0
WIDTHS	0.0	12.0	0.0	0.0	12.0	0.0	0.0	12.0	0.0	0	1	0
LANES	0	1	0	0	1	0	0	1	0	NORM	NORM	NORM
GROUPTYPES	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	NORM	0.00	0.00	0.00
UTILIZATIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.0	2.0	2.0
TRUCKPERCENTS	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.90	0.90	0.90
PEAKHOURFACTORS	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	3	3	3
ARRIVALTYPES	2	2	2	3	3	3	3	3	3	NO	YES	YES
ACTUATIONS	NO	YES	YES	NO	YES	YES	NO	YES	YES	5.0	5.0	5.0
REQCLEARANCES	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0
MINIMUMS	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	2.0	2.0
STARTUPLOST	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0
ENDGAIN	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0	0	0
STORAGE	0	0	0	0	0	0	0	0	0	0	0	1900
INITIALQUEUE	0	0	0	0	0	0	0	0	0	1900	1900	1.00
IDEALSATFLOWS	1900	1900	1900	1900	1900	1900	1900	1900	1900	1.00	1.00	1.00
FACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
DELAYFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
NSTOPFACTORS	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0	1444	0
SATURATIONFLOWS	0	1449	0	0	1628	0	0	1786	0			

Phasing Parameters

SEQUENCES	11	11			LEADLAGS	NONE	NONE
PERMISSIVES	NO	NO	NO	NO	OFFSET	0.00	1
OVERLAPS	YES	YES	YES	YES	PEDTIME	0.0	0
CYCLES	60	180	10				
GREENTIMES	42.00	8.00					
YELLOWTIMES	5.00	5.00					
CRITICALS	2	5					
EXCESS	0						

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	AM PEAK 2007
Comment	YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date	KULA, MAUI 4/27/2004
Major Street	KULA HWY
Minor Street	KEKAULIKE AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	60	230			335	15				30		100
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	67	256			372	17				33		111
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	LR	144	547	.263	1	13.9	B	13.9
	2								B
	3								
		①	67	1164	.057	<1	8.3	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	PM PEAK 2007
Comment	YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date	KULA, MAUI 4/27/2004
Major Street	KULA HWY
Minor Street	KEKAULIKE AVE

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		LR
Lane 2				
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)	95	310			330	20				25		45
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	106	344			367	22				28		50
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	LR	78	428	.182	1	15.3	C	15.3
	2								C
	3								
		①	106	1164	.091	<1	8.4	A	
		④							

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	AM PEAK 2007	Minor Street	PUEO DR
Comment	YEAR 2007 WITH PROJECT		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		220	25	5	280		30		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		244	28	6	311		33		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
EB	1	LR	39	502	.078	<1	12.8	B	12.8
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1285	.004	<1	7.8	A	

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN	Jurisdiction/Date	KULA, MAUI 4/27/2004
Agency or Company	ATA	Major Street	KULA HWY
Analysis Period/Year	PM PEAK 2007	Minor Street	PUEO DR
Comment	YEAR 2007 WITH PROJECT		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		300	30	5	310		10		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		333	33	6	344		11		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
EB	1	LR	17	469	.036	<1	13	B	13
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1186	.005	<1	8	A	

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	AM PEAK 2007
Comment	YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date	KULA, MAUI 4/27/2004
Major Street	KULA HWY
Minor Street	WAIOHULI LOT 134 ROADWAY

Input Data												
Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			LT			LR					
Lane 2												
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)		225	5	5	285		5		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		250	6	6	317		6		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
EB	1	LR	12	589	.02	<1	11.2	B	11.2 B
	2								
	3								
WB	1								
	2								
	3								
		①							
		④	6	1304	.004	<1	7.8	A	

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	MN
Agency or Company	ATA
Analysis Period/Year	PM PEAK 2007
Comment	YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date	KULA, MAUI 4/27/2004
Major Street	KULA HWY
Minor Street	WAIOHULI LOT 134 ROADWAY

Input Data												
Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	TR			LT			LR					
Lane 2												
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)		300	5	5	310		5		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		333	6	6	344		6		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
EB	1	LR	12	515	.023	<1	12.2	B	12.2 B
	2								
	3								
WB	1								
	2								
	3								
		①							
		④	6	1215	.005	<1	8	A	

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: AM PEAK 2007
Comment: YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date: KULA, MAUI 4/27/2004
Major Street: KULA HWY
Minor Street: LAUIE DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		180	55	5	215		65		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		200	61	6	239		72		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
EB	1	LR	78	554	.141	<1	12.6	B	12.6
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1297	.004	<1	7.8	A	

1 of 1

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CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: MN
Agency or Company: ATA
Analysis Period/Year: PM PEAK 2007
Comment: YEAR 2007 WITH PROJECT

Site Information

Jurisdiction/Date: KULA, MAUI 4/27/2004
Major Street: KULA HWY
Minor Street: LAUIE DR

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	TR	LT	LR	
Lane 2				
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)		225	70	5	275		45		5			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		250	78	6	306		50		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
EB	1	LR	56	476	.118	<1	13.6	B	13.6
	2								B
	3								
WB	1								
	2								
	3								
		①							
		④	6	1226	.005	<1	7.9	A	

1 of 1

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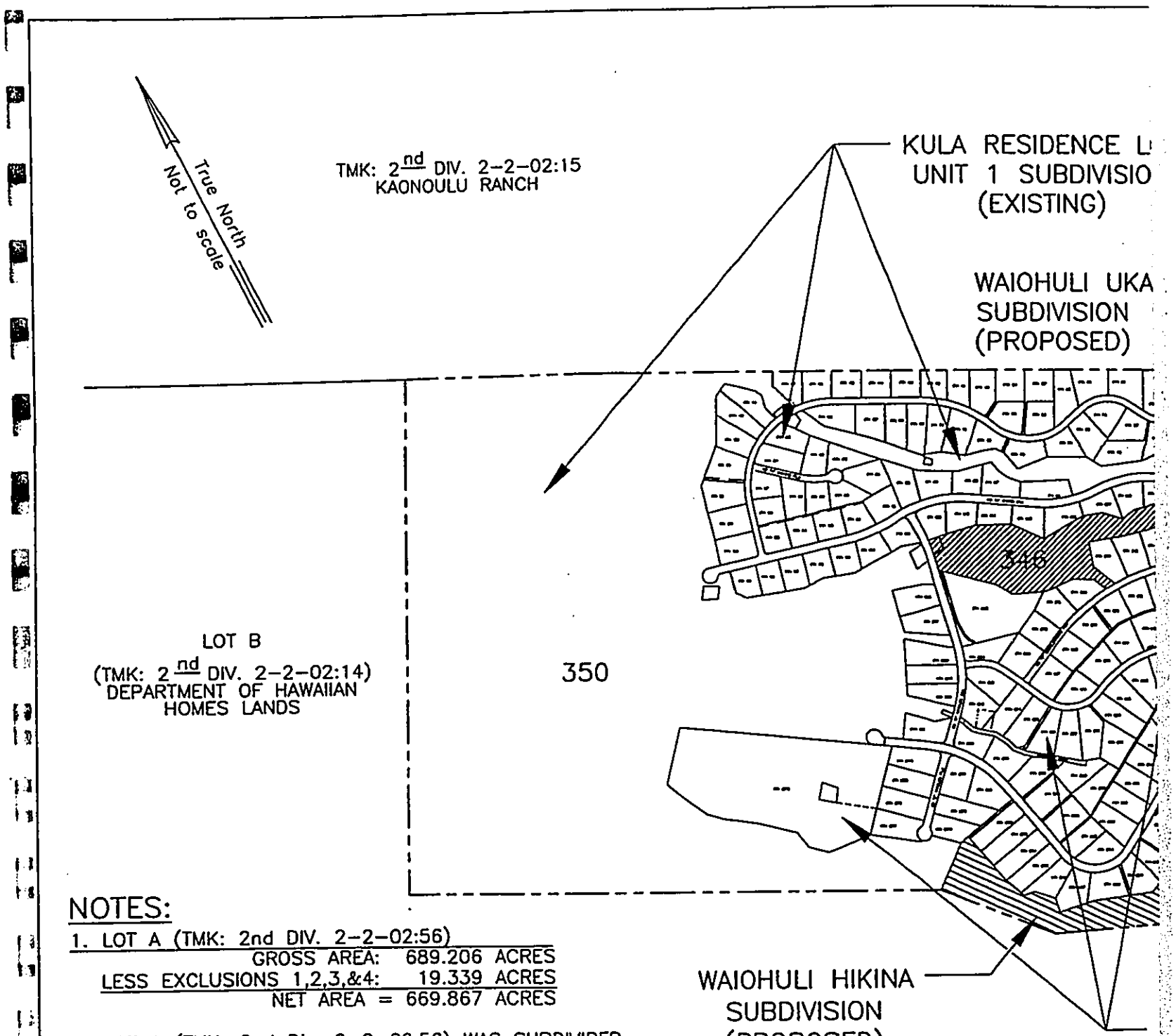
REDUCED IN
FILE

RECEIVED AS FOLLOWS



NOTES:

1. LOT A (TMK: 2nd DIV. 2-2-02:56)
   GROSS AREA: 689.206 ACRES
   LESS EXCLUSIONS 1,2,3,&4: 19.339 ACRES
   NET AREA = 669.867 ACRES

2. LOT A (TMK: 2nd Div. 2-2-02:56) WAS SUBDIVIDED BY THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE No. 2.2305) INTO LOTS 1 THRU 350, INCLUSIVE.

3. PROPOSED WAIOHULI LOT 134 SUBDIVISION WILL AFFECT LOT 134 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI UKA SUBDIVISION WILL AFFECT LOTS 112, 137, 193, 194, 195, 343, & 346 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI HIKINA SUBDIVISION WILL AFFECT LOTS 294, 295, 345, & 349 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   REF.: KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

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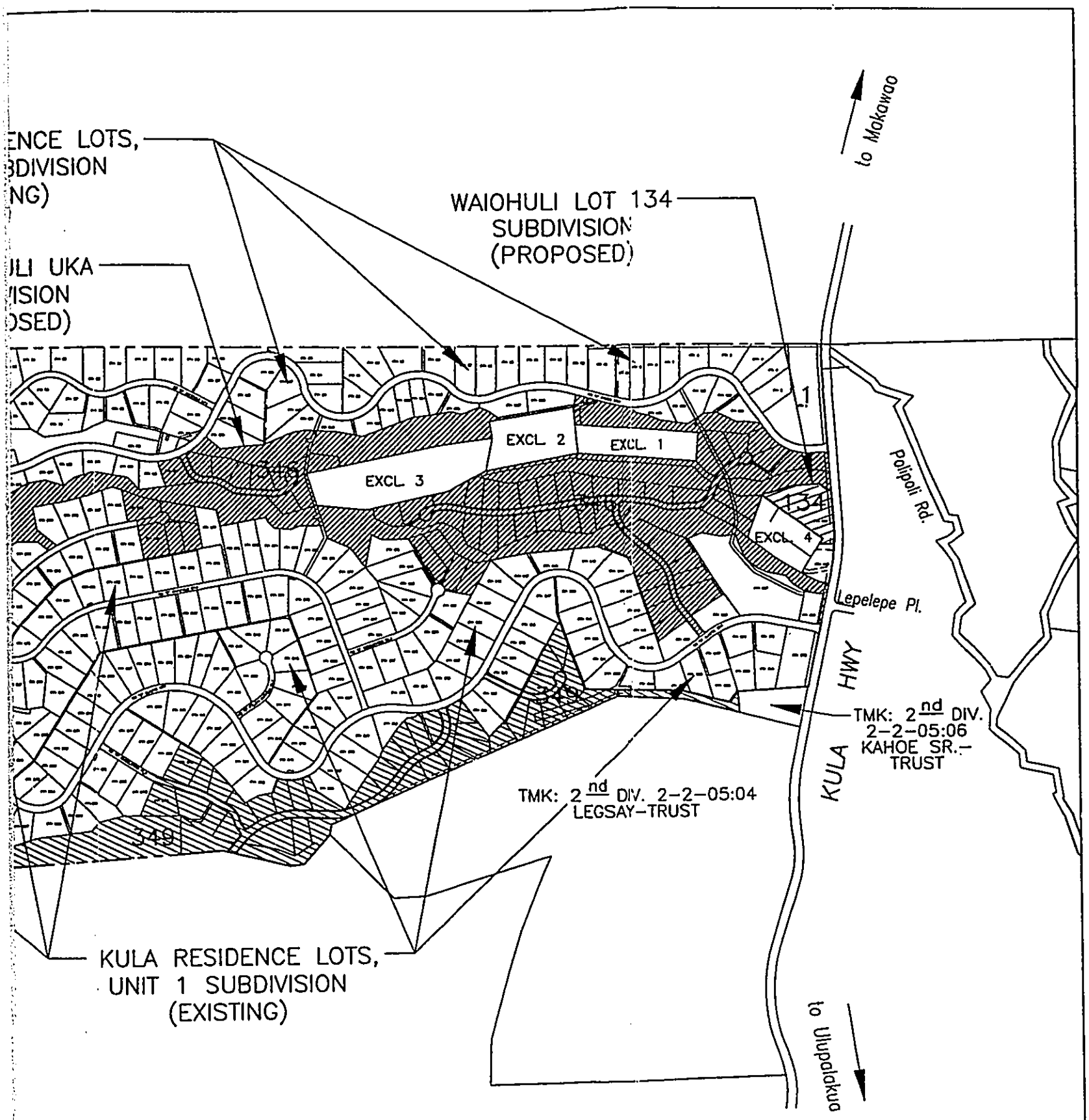
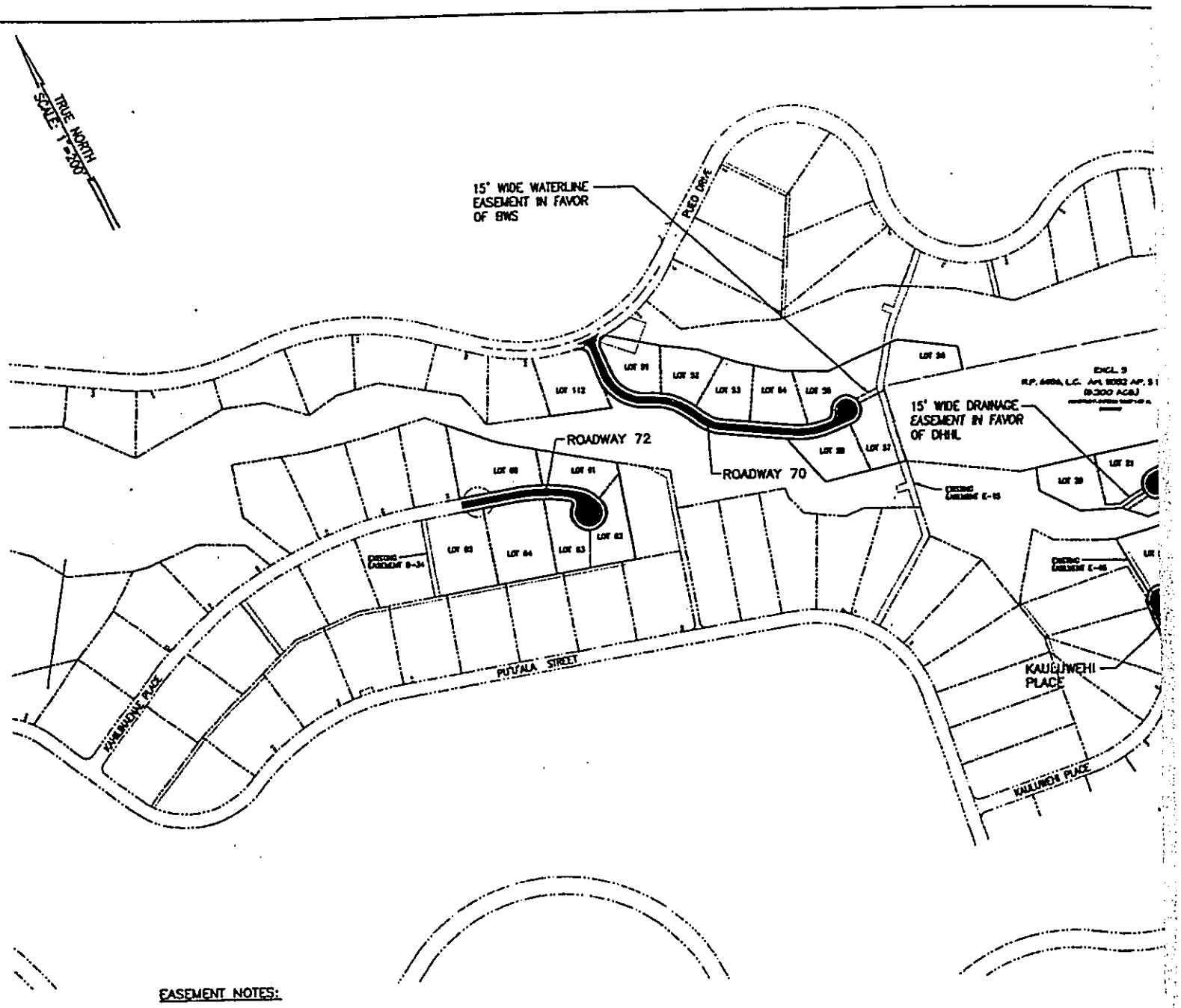


PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

SCHEMATIC PLAT MAP

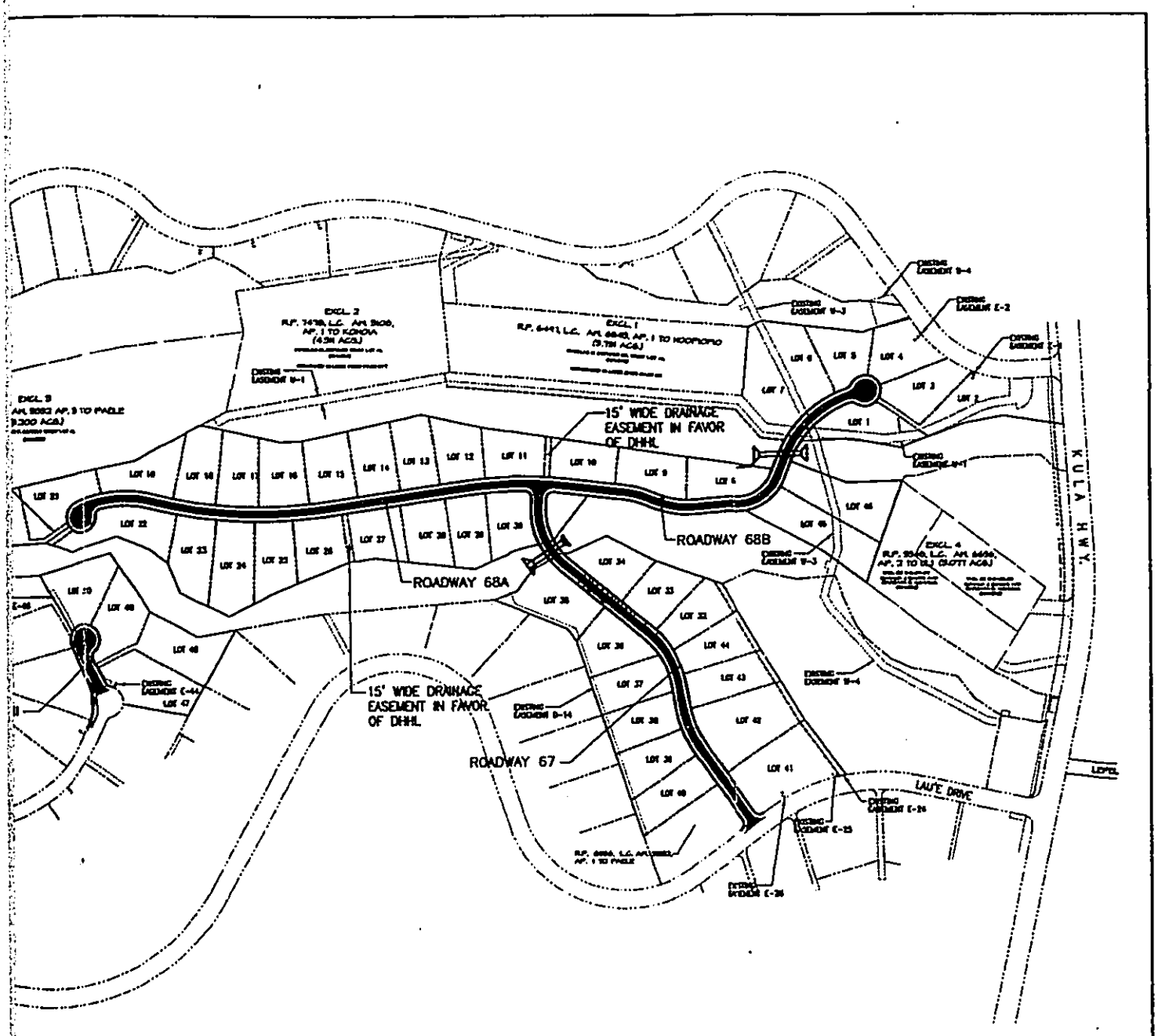
RECEIVED AS FOLLOWS



EASEMENT NOTES:

1. ALL PROPOSED ROADS ARE IN FAVOR OF COUNTY. (RDS. "67", "68A", "68B", "70", "72" AND KAULUWEHI PLACE)
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY CO. OR COUNTY.
3. WATERLINE & ACCESS EASEMENTS IN FAVOR OF BWS ARE 20 FT. WIDTH, UNLESS NOTED OTHER-WISE.
4. DRAINAGE & MAINTENANCE EASEMENTS AT ROAD CULVERT CROSSINGS ARE IN FAVOR OF COUNTY. SEE ROAD PLAN/PROFILE FOR DIMENSIONS.

RECEIVED AS FOLLOWS

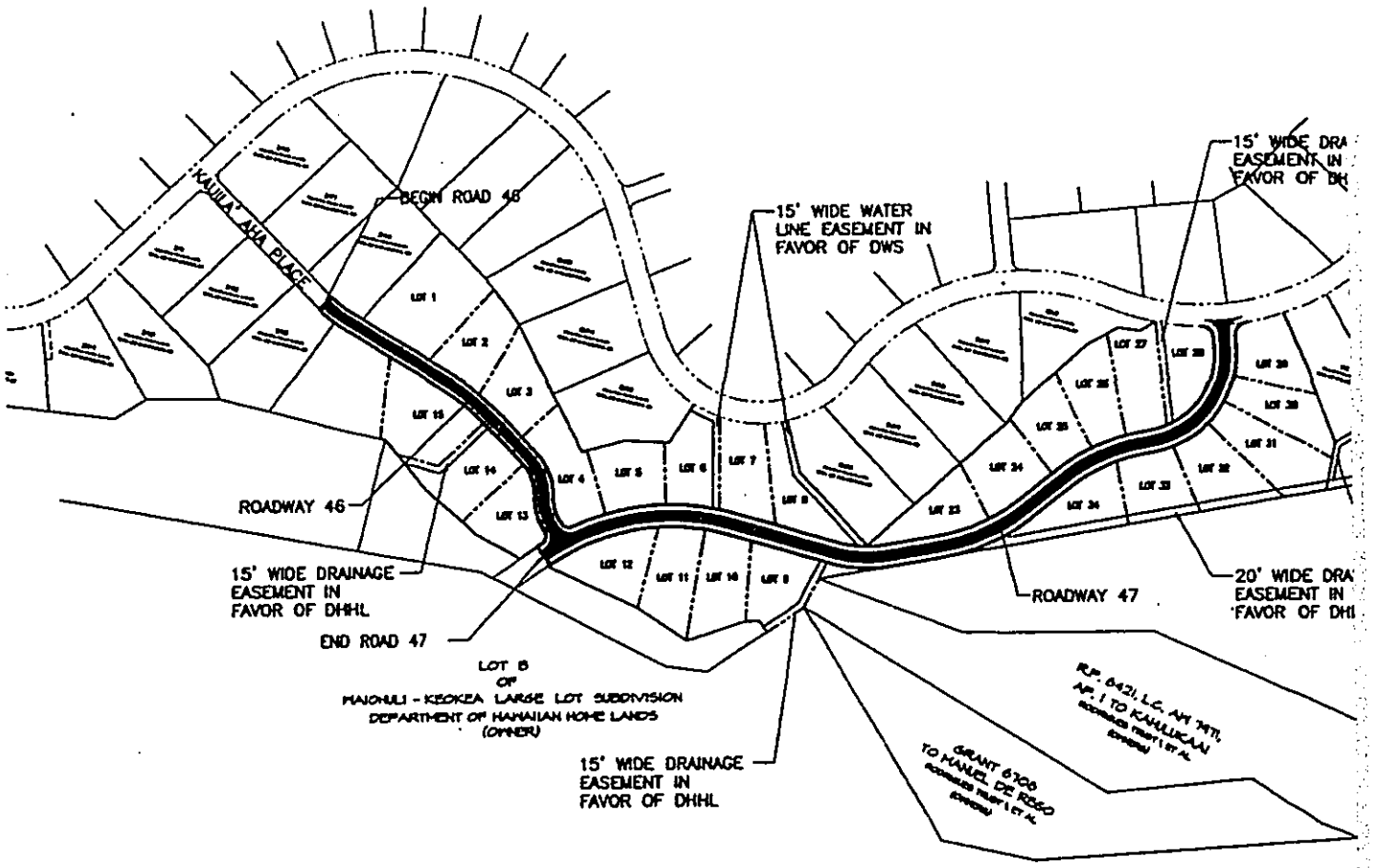


HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

WAIOHULI UKA SUBDIVISION GENERAL PLAN

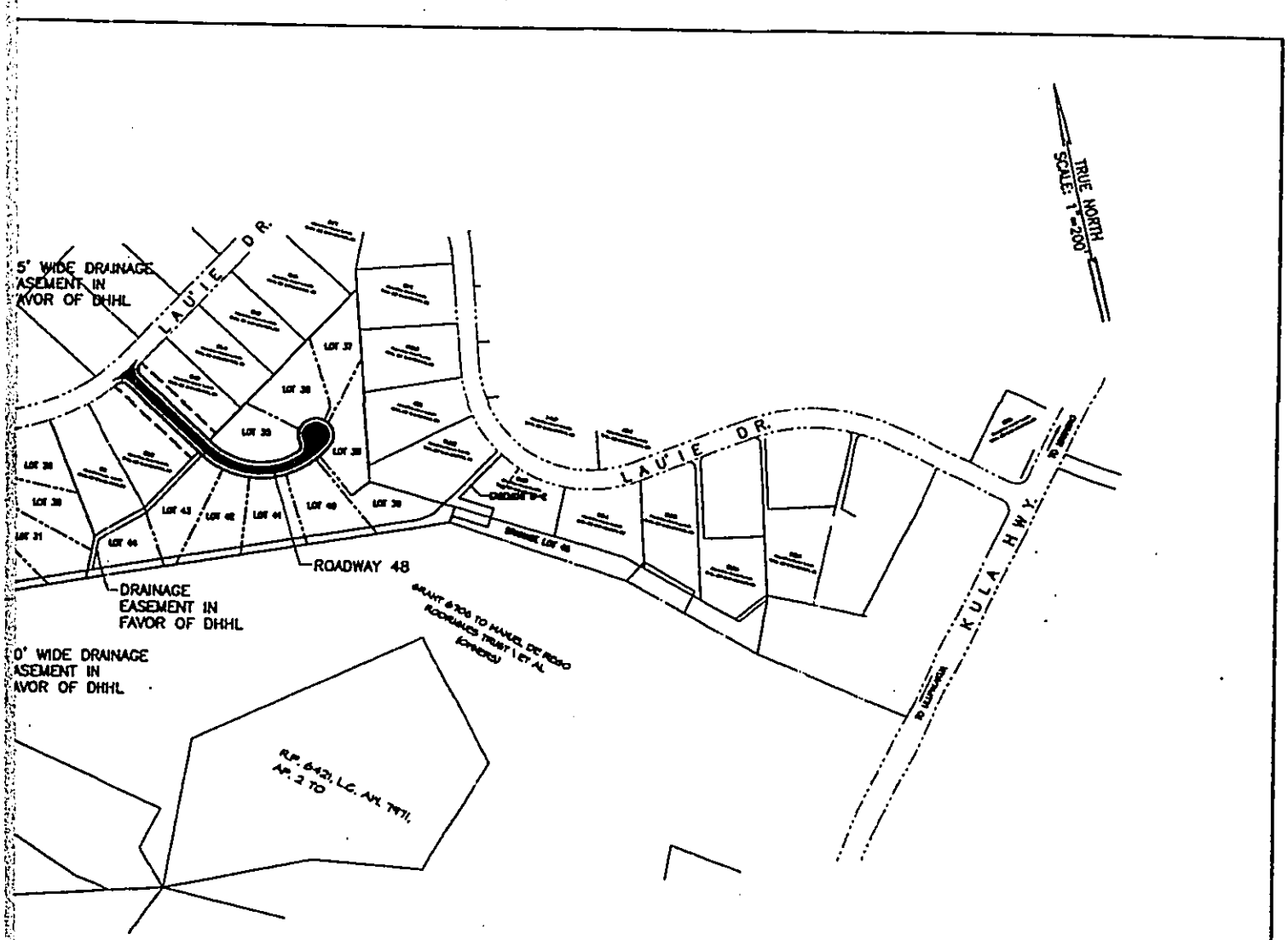
RECEIVED AS FOLLOWS



EASEMENT NOTES:

1. ALL PROPOSED ROADS ARE IN FAVOR OF COUNTY. (RDS. "46", "47" AND "48"
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY CO. OR COUNTY.
3. ALL PRESSURE REDUCING STATIONS ARE IN FAVOR OF DWS.
4. WATERLINE & ACCESS EASEMENTS IN FAVOR OF BWS ARE 20 FT. WIDTH, UNLESS NOTED OTHER-WISE.
5. DRAINAGE & MAINTENANCE EASEMENTS AT ROAD CULVERT CROSSINGS ARE IN FAVOR OF COUNTY. SEE ROAD PLAN/ PROFILE FOR DIMENSIONS.
6. DRAINAGE EASEMENTS IN FAVOR OF LESSEES ARE 10 FT. WIDTH, UNLESS NOTED OTHERWISE.
7. OTHER DRAINAGE EASEMENTS ARE 15 FT. WIDTH.

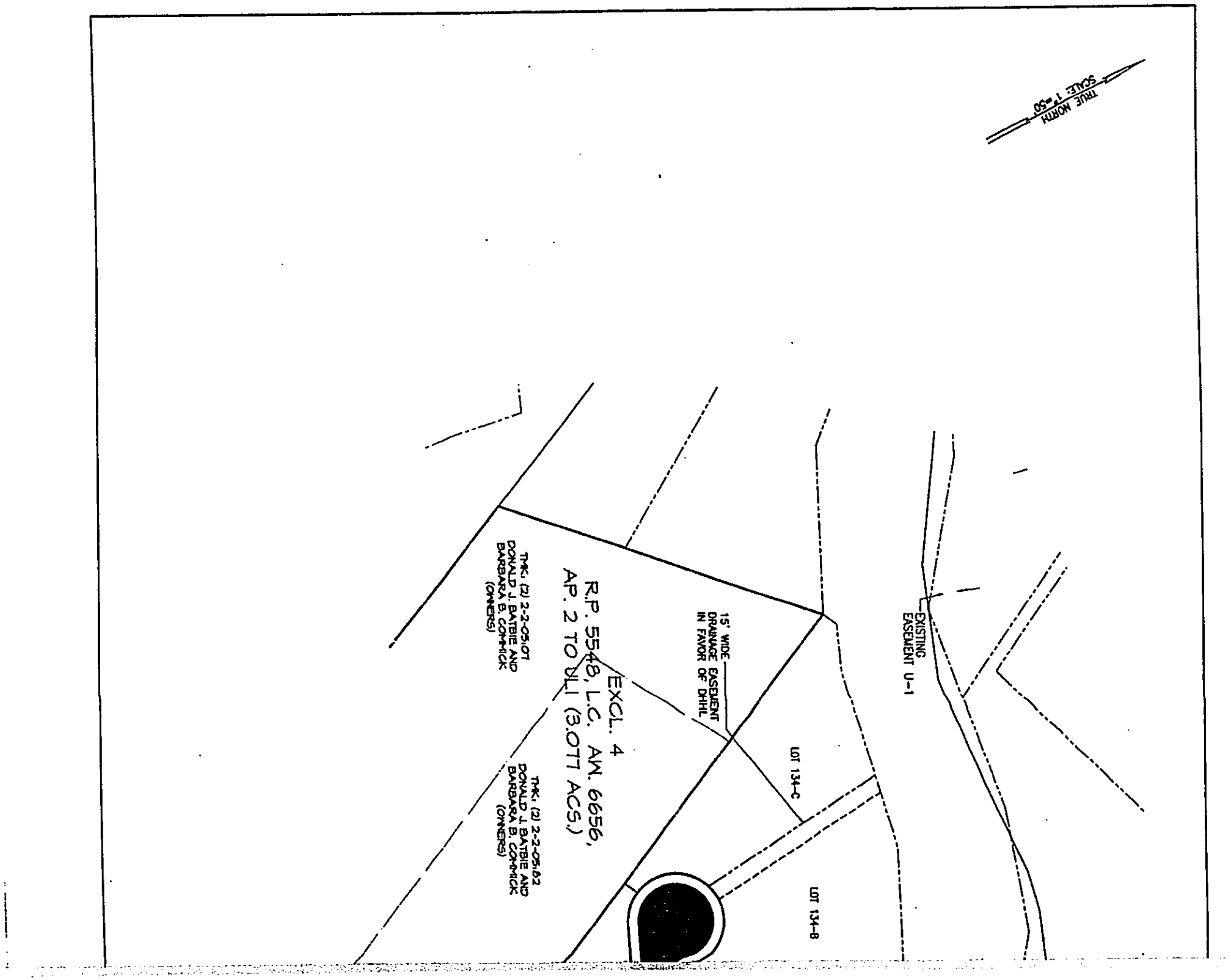
RECEIVED AS FOLLOWS



HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

WAIOHULI HIKINA SUBDIVISION GENERAL PLAN



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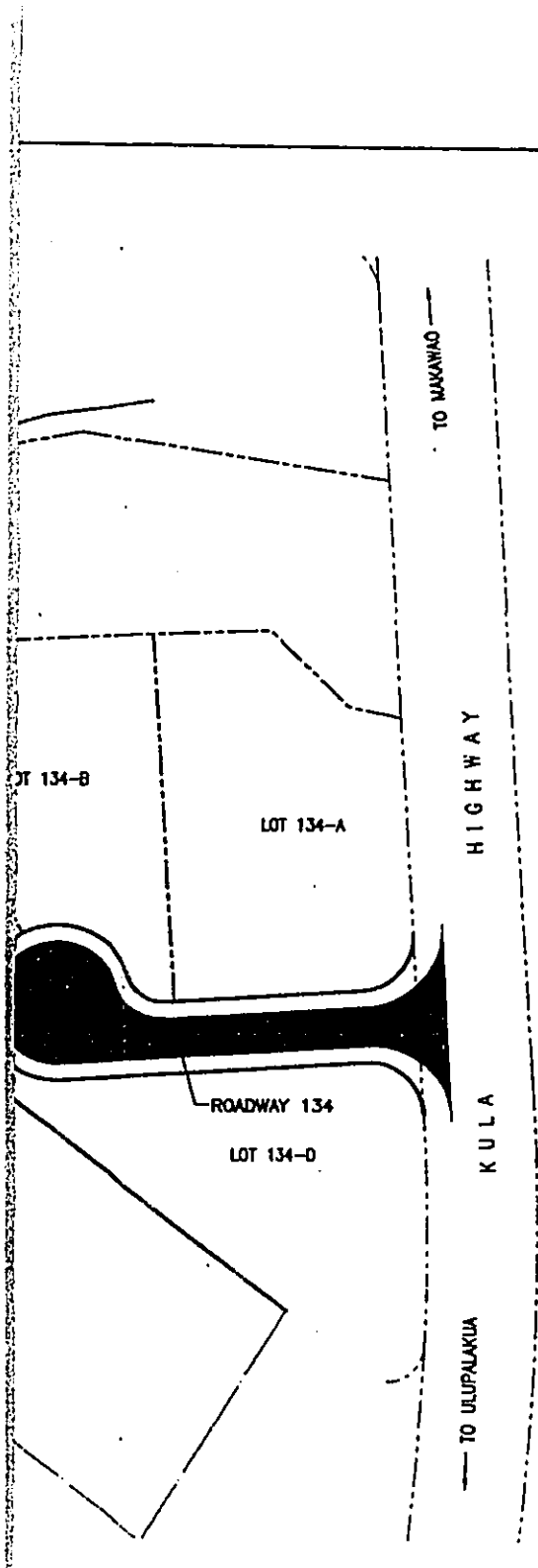


EASEMENT NOTES

1. PROPOSED ROAD IS IN FAVOR OF COUNTY
2. ALL UTILITIES WITHIN ROAD RIGHT-OF-WAY ARE IN FAVOR OF UTILITY COMPANY OR COUNTY

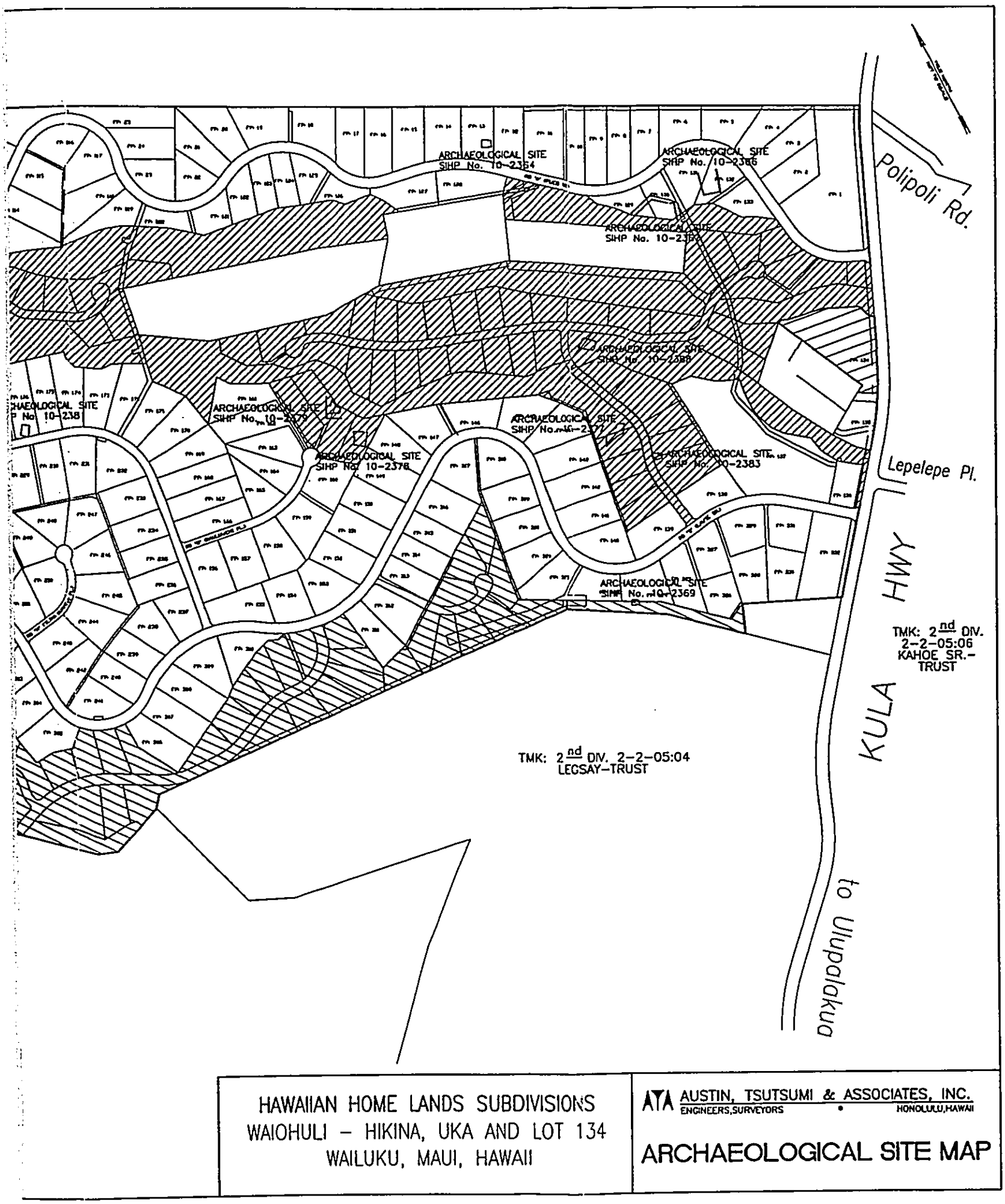
HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

WAIOHULI LOT 134 SUBDIVISION GENERAL PLAN

RECEIVED AS FOLLOWS

RECEIVED AS FOLLOWS

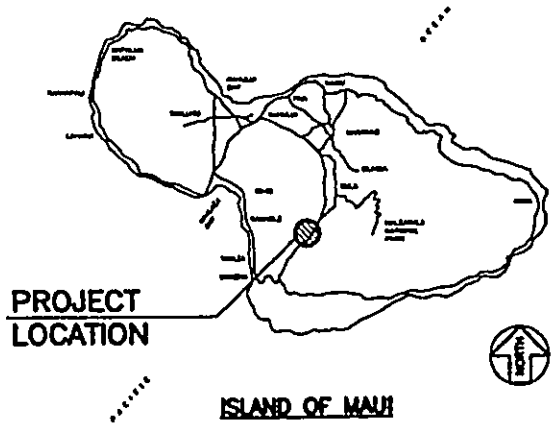


HAWAIIAN HOME LANDS SUBDIVISIONS
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

ARCHAEOLOGICAL SITE MAP

RECEIVED AS FOLLOWS

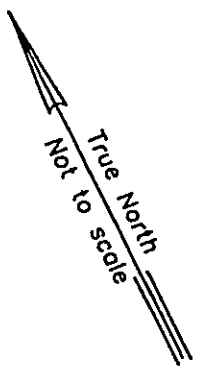


VICINITY MAP
NOT TO SCALE

TMK: 2nd Div. 2-
KAONOULU RA

UNI
(F

LO
(TMK: 2nd
DEPARTME
HOM



REF.: 1. WAIOHULI KEOKEA LARGE LOT SUBDIVISION
(LUCA FILE No. 2.2300)

2. KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION
(LUCA FILE No. 2.2305)

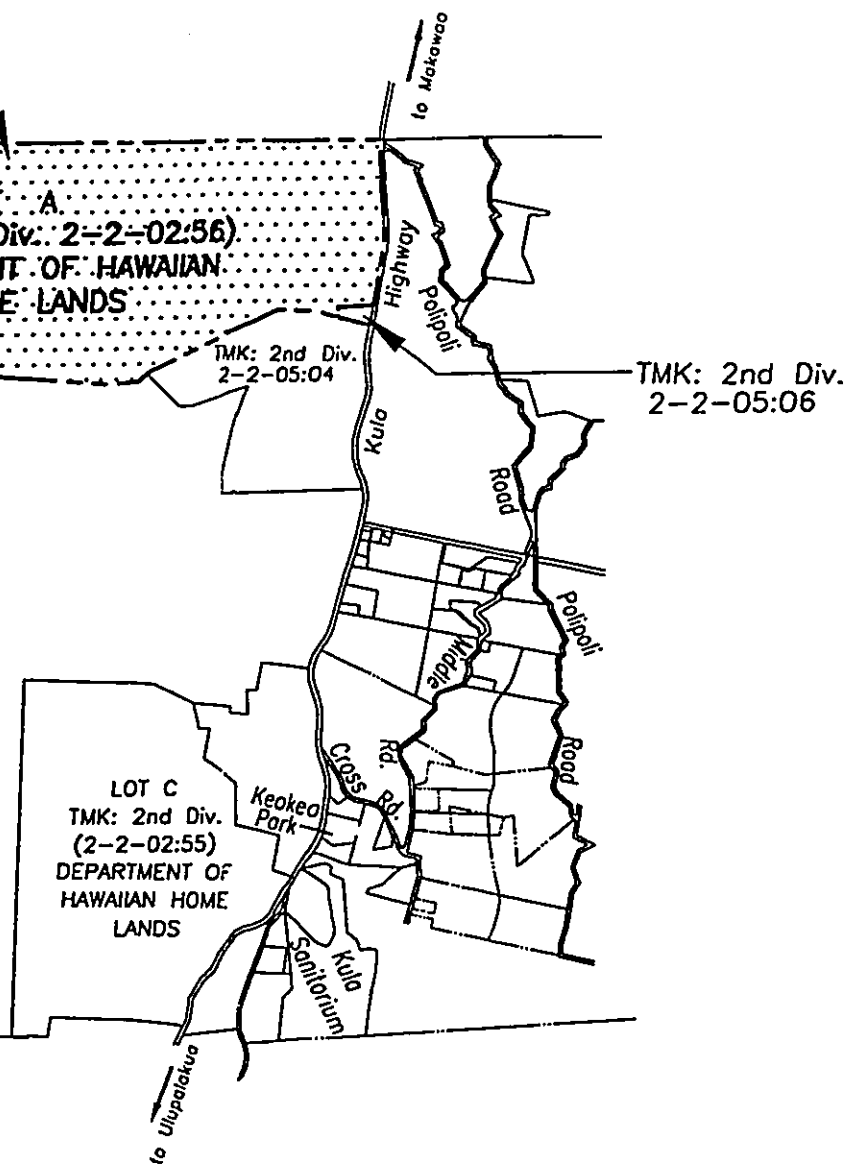
LOCA

RECEIVED AS FOLLOWS

Div. 2-2-02:15
ULU RANCH

KULA RESIDENCE LOTS,
UNIT 1 SUBDIVISION/PROJECT SITE
(Refer to Site Plan for Details)

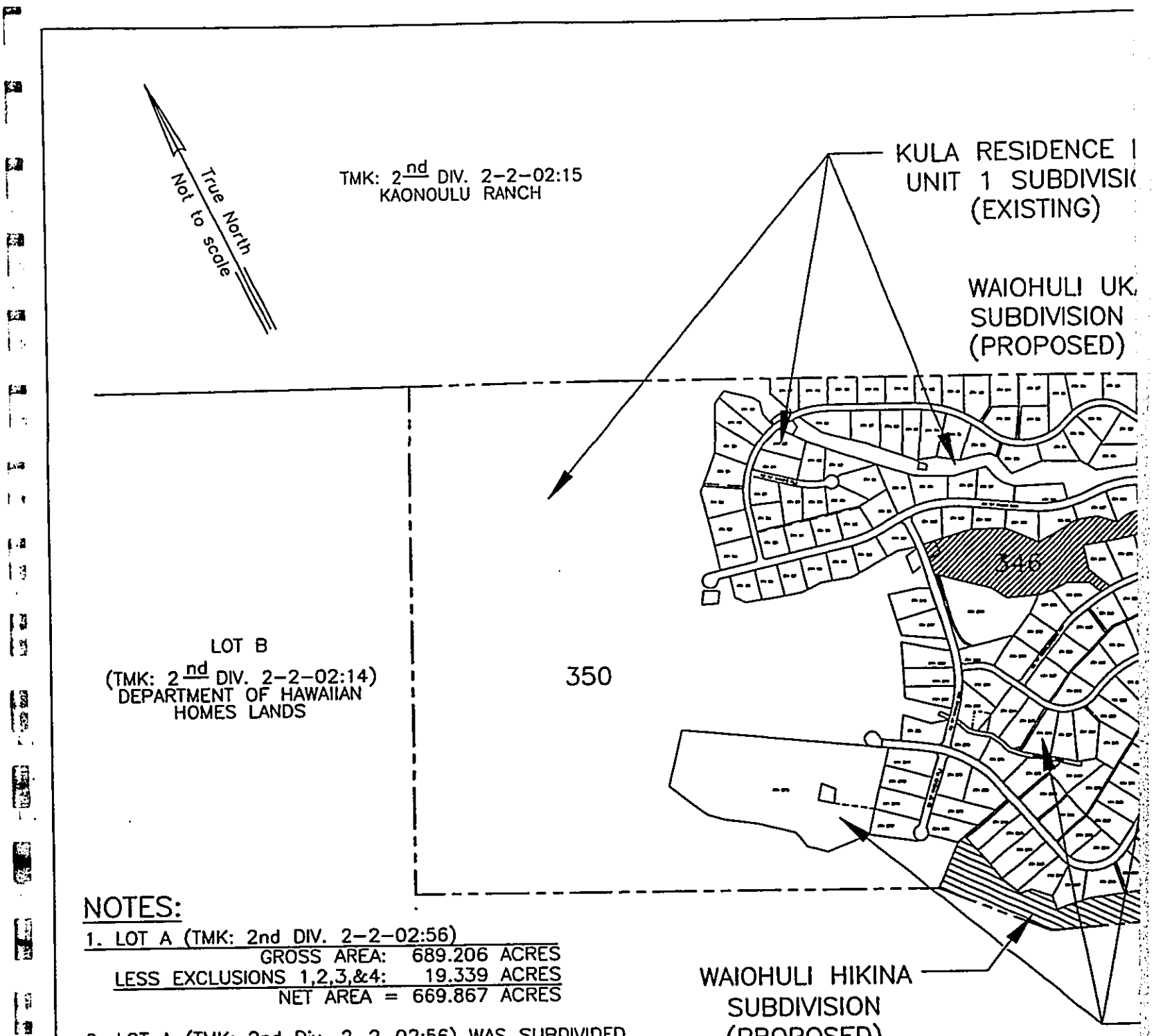
LOT B
2nd Div. 2-2-02:14)
RTMENT OF HAWAIIAN
HOME LANDS



OCATION MAP

PRELIMINARY ENGINEERING REPORT HAWAIIAN HOME LAND SUBDIVISION WAIOHULI – HIKINA, UKA AND LOT 134 WAILUKU, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII **LOCATION/VICINITY MAPS**	EXHIBIT **1**

RECEIVED AS FOLLOWS



NOTES:

1. LOT A (TMK: 2nd DIV. 2-2-02:56)

GROSS AREA:	689.206 ACRES
LESS EXCLUSIONS 1,2,3,&4:	19.339 ACRES
NET AREA =	669.867 ACRES

2. LOT A (TMK: 2nd Div. 2-2-02:56) WAS SUBDIVIDED BY THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE No. 2.2305) INTO LOTS 1 THRU 350, INCLUSIVE.

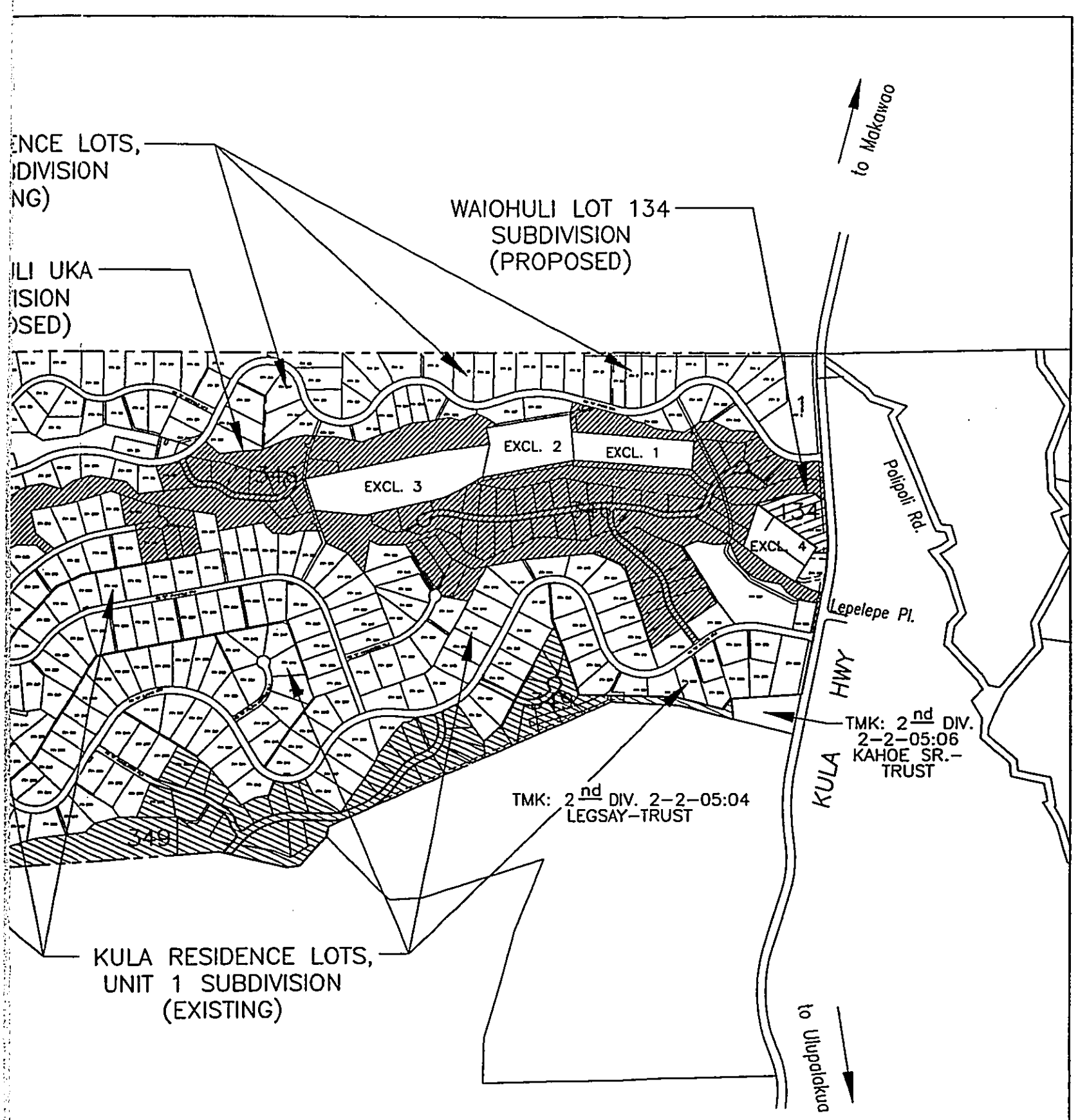
3. PROPOSED WAIOHULI LOT 134 SUBDIVISION WILL AFFECT LOT 134 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI UKA SUBDIVISION WILL AFFECT LOTS 112, 137, 193, 194, 195, 343, & 346 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

   PROPOSED WAIOHULI HIKINA SUBDIVISION WILL AFFECT LOTS 294, 295, 345, & 349 OF THE KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

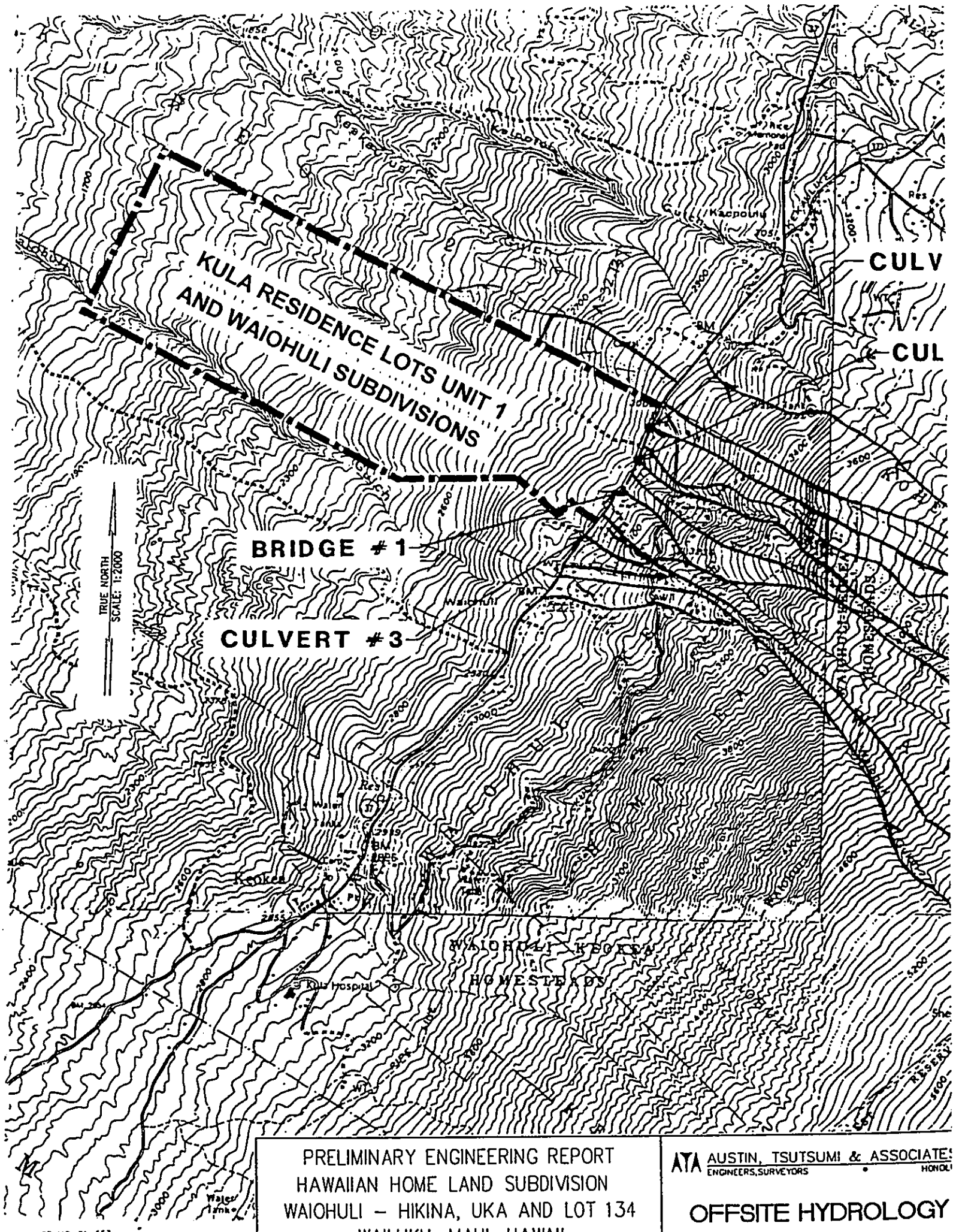
   REF.: KULA RESIDENCE LOTS, UNIT 1 SUBDIVISION (LUCA FILE NO. 2.2305)

RECEIVED AS FOLLOWS



PRELIMINARY ENGINEERING REPORT HAWAIIAN HOME LAND SUBDIVISION WAIOHULI – HIKINA, UKA AND LOT 134 WAILUKU, MAUI, HAWAII	AUSTIN, TSUTSUMI & ASSOCIATES, INC. ENGINEERS, SURVEYORS • HONOLULU, HAWAII SCHEMATIC PLAT MAP	EXHIBIT 2

RECEIVED AS FOLLOWS



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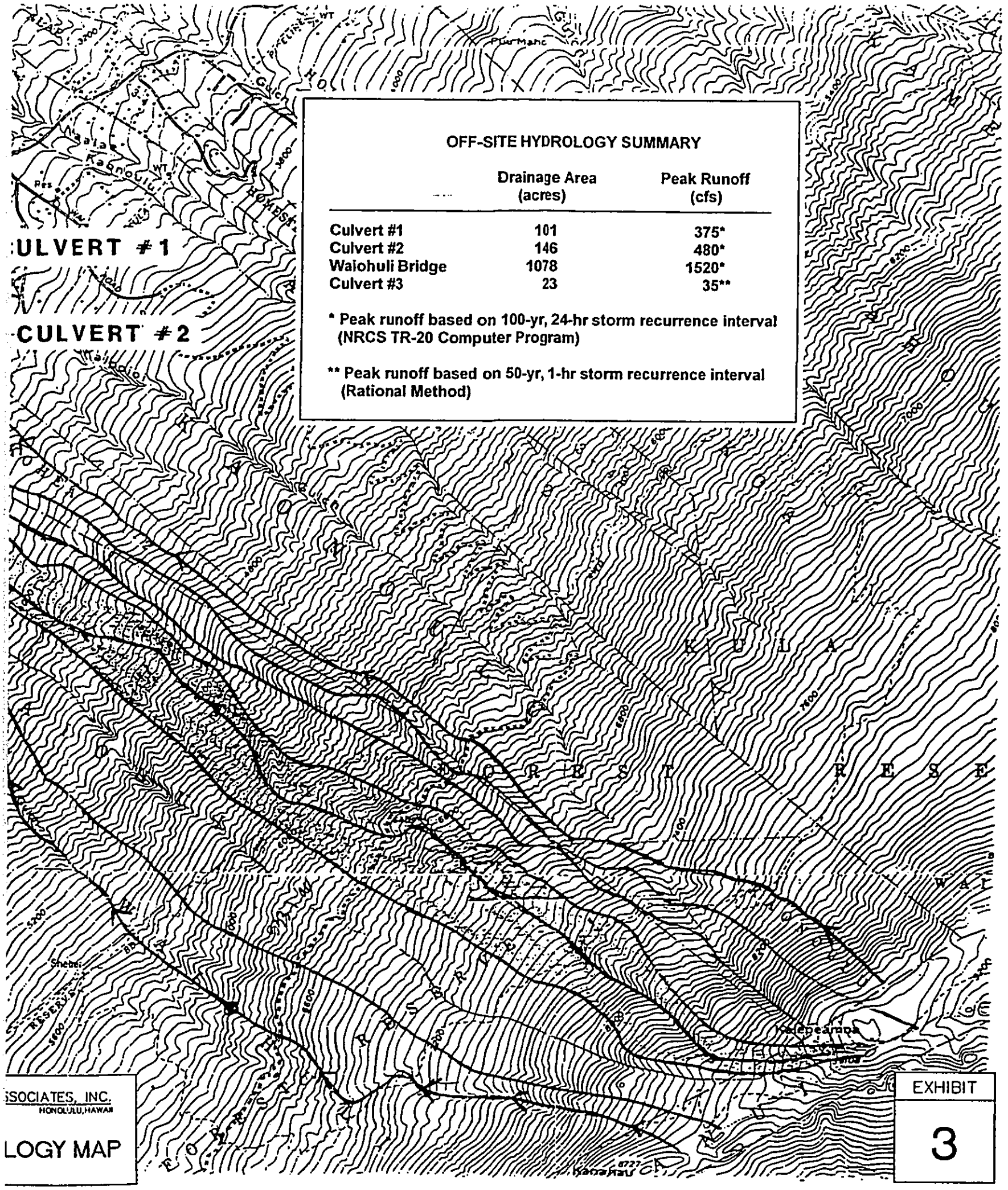


OFF-SITE HYDROLOGY SUMMARY

	Drainage Area (acres)	Peak Runoff (cfs)
Culvert #1	101	375*
Culvert #2	146	480*
Waiohuli Bridge	1078	1520*
Culvert #3	23	35**

* Peak runoff based on 100-yr, 24-hr storm recurrence interval (NRCS TR-20 Computer Program)

** Peak runoff based on 50-yr, 1-hr storm recurrence interval (Rational Method)

SOCIATES, INC.
HONOLULU, HAWAII

LOGY MAP

EXHIBIT

3

RECEIVED AS FOLLOWS

LEGEND

EXISTING PIPE
PROPOSED PIPE

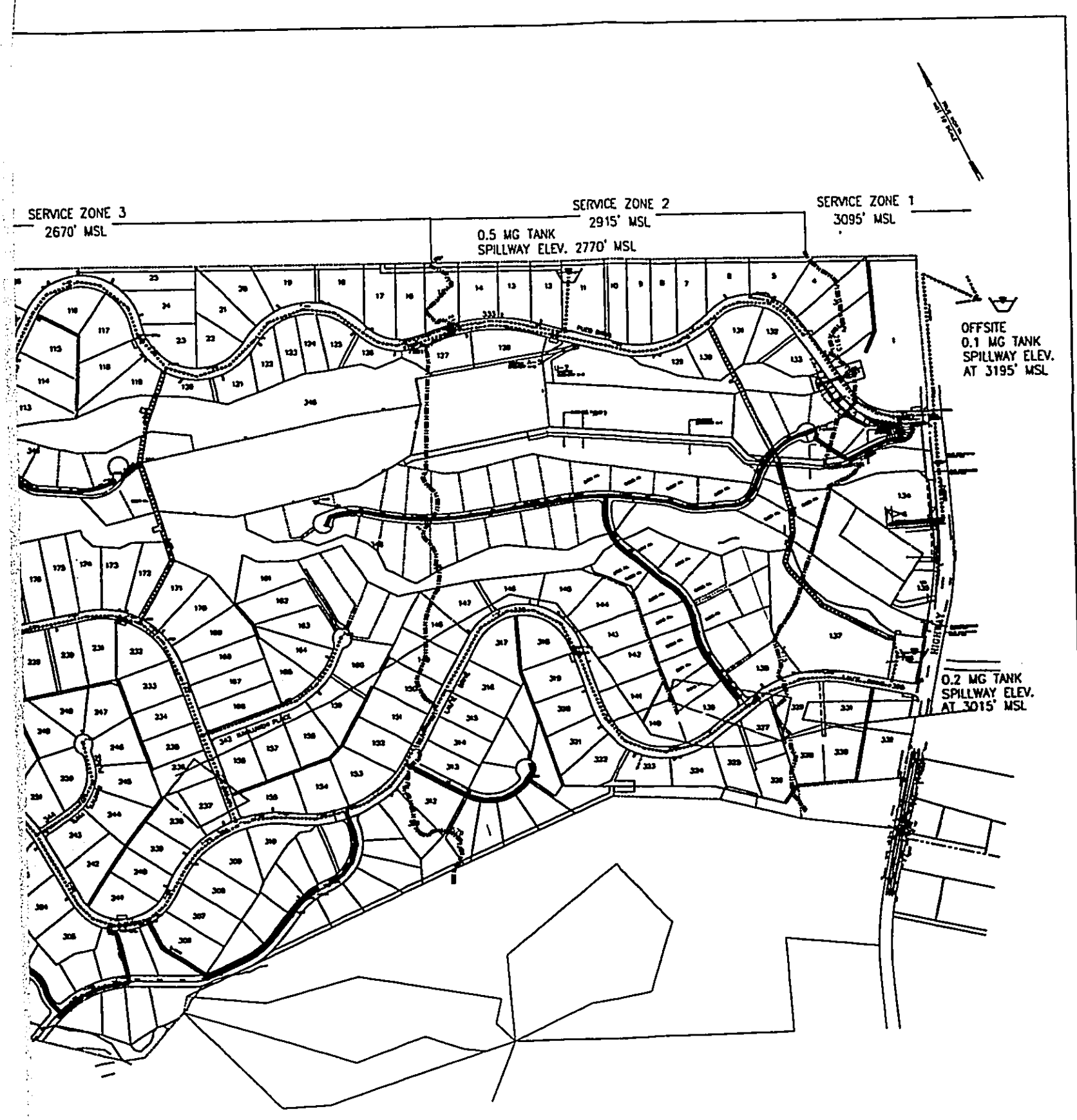
SERVICE ZONE 4
2270' MSL

SERVICE
2670

0.2 MG TANK
SPILLWAY ELEV. 2370' MSL

JOB NO. 01-553

RECEIVED AS FOLLOWS



PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

WATER SYSTEM MAP

EXHIBIT

4

FN: 01-553\PER\EX4-water.dwg

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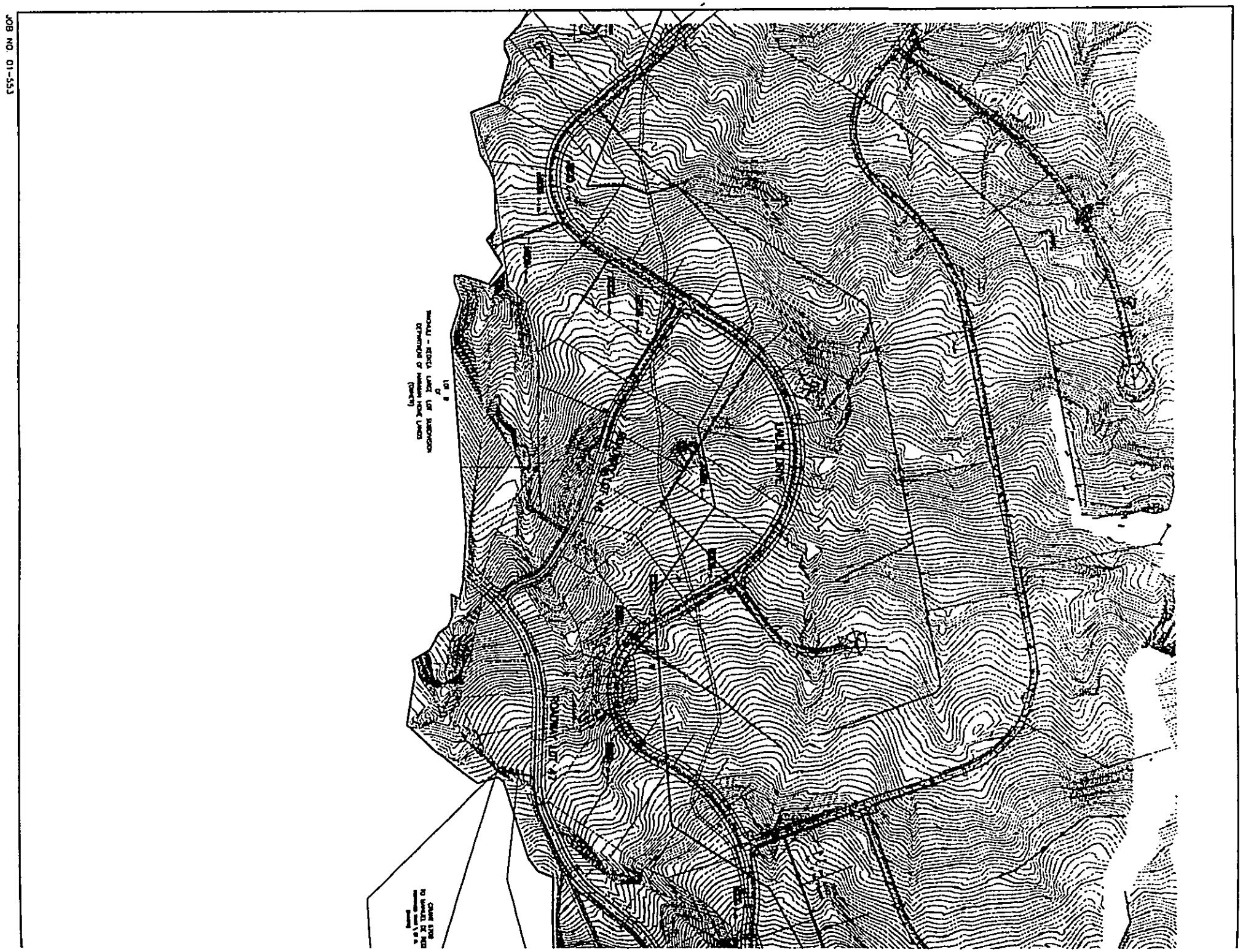

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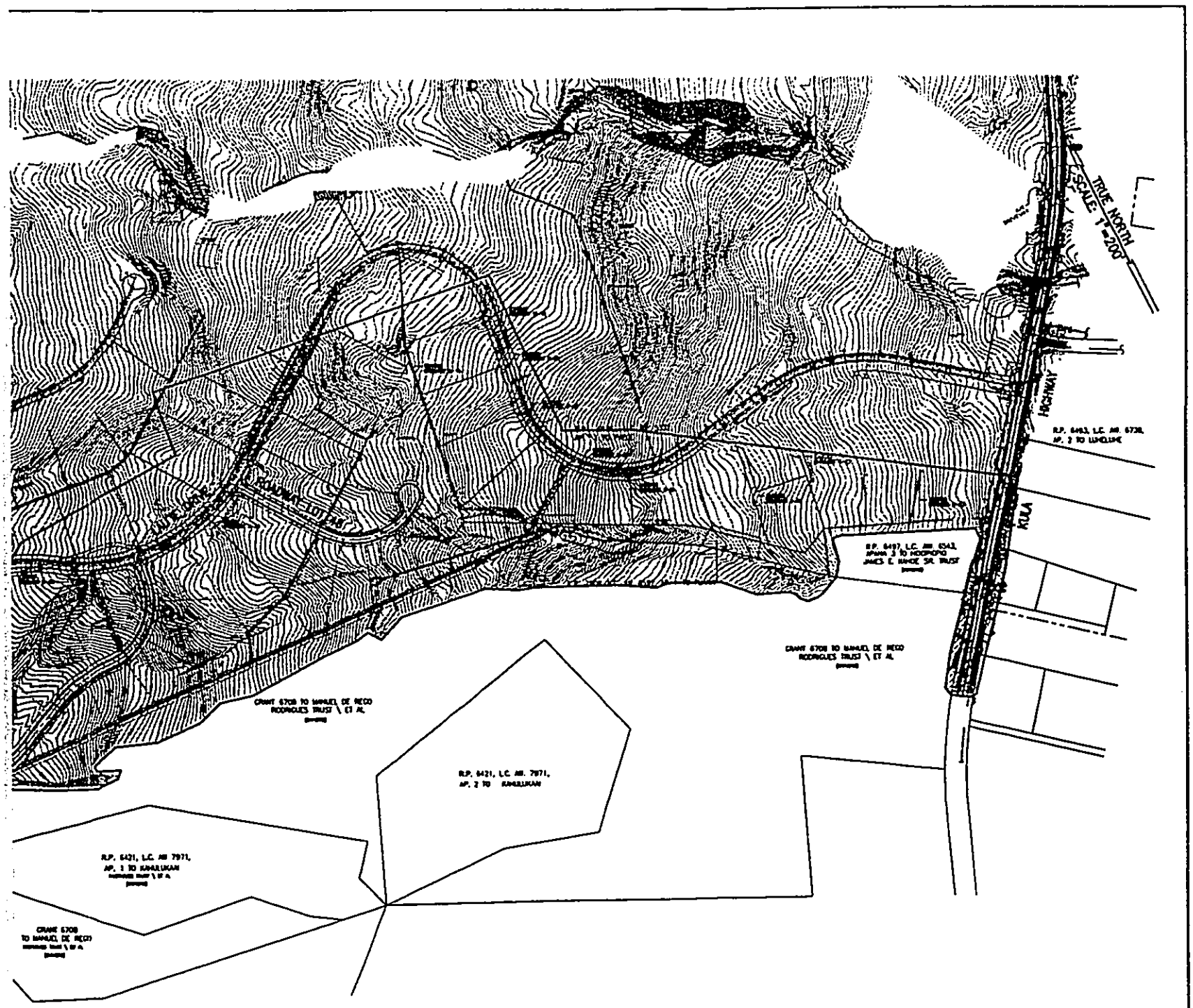


PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

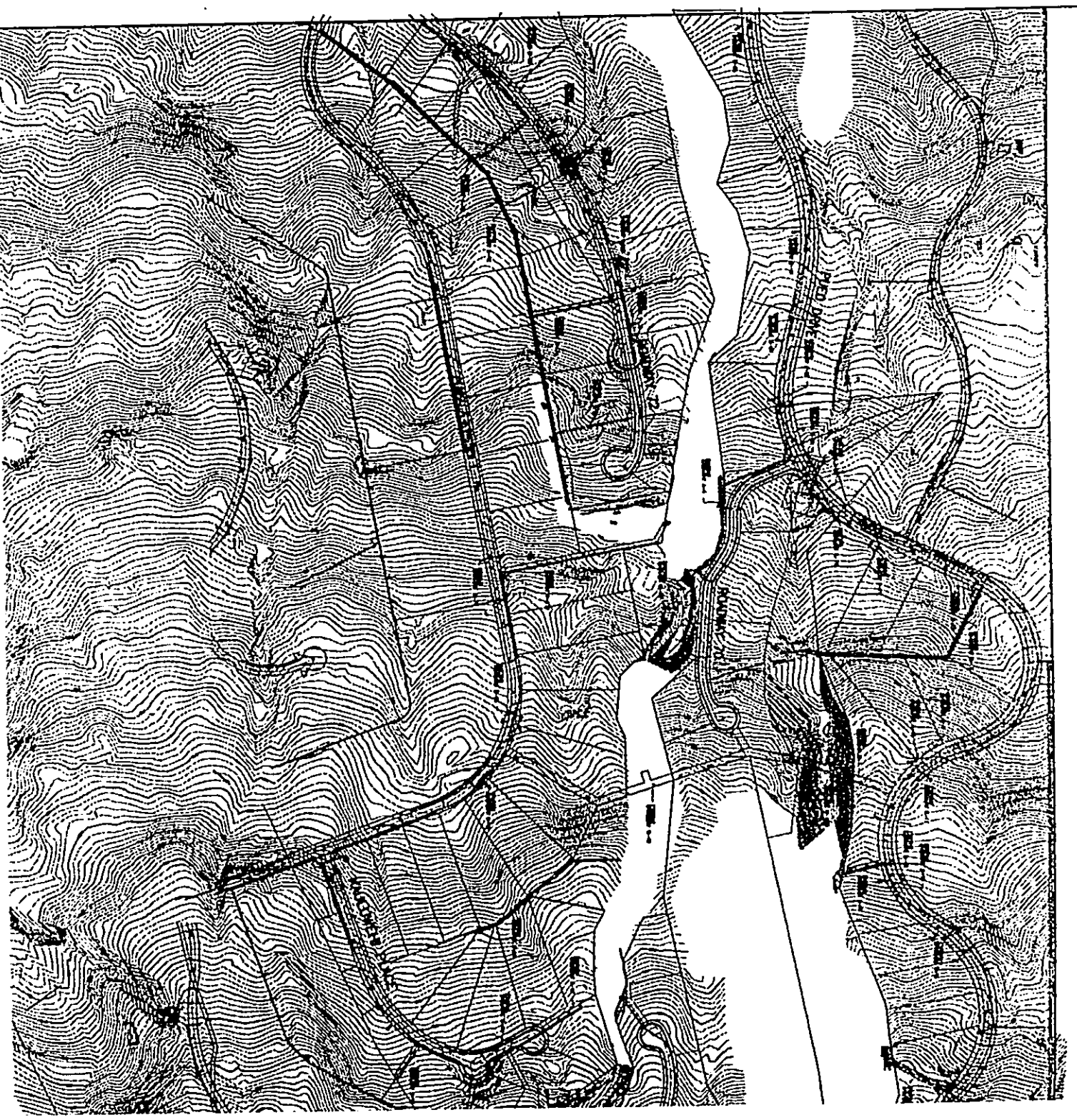
WAIOHULI HIKINA
ON-SITE HYDROLOGY MAP

EXHIBIT
5

FN: 01-553\PER\EXH-HIKINA-DRAINAGE.dwg

RECEIVED AS FOLLOWS

JOB NO. 81-553



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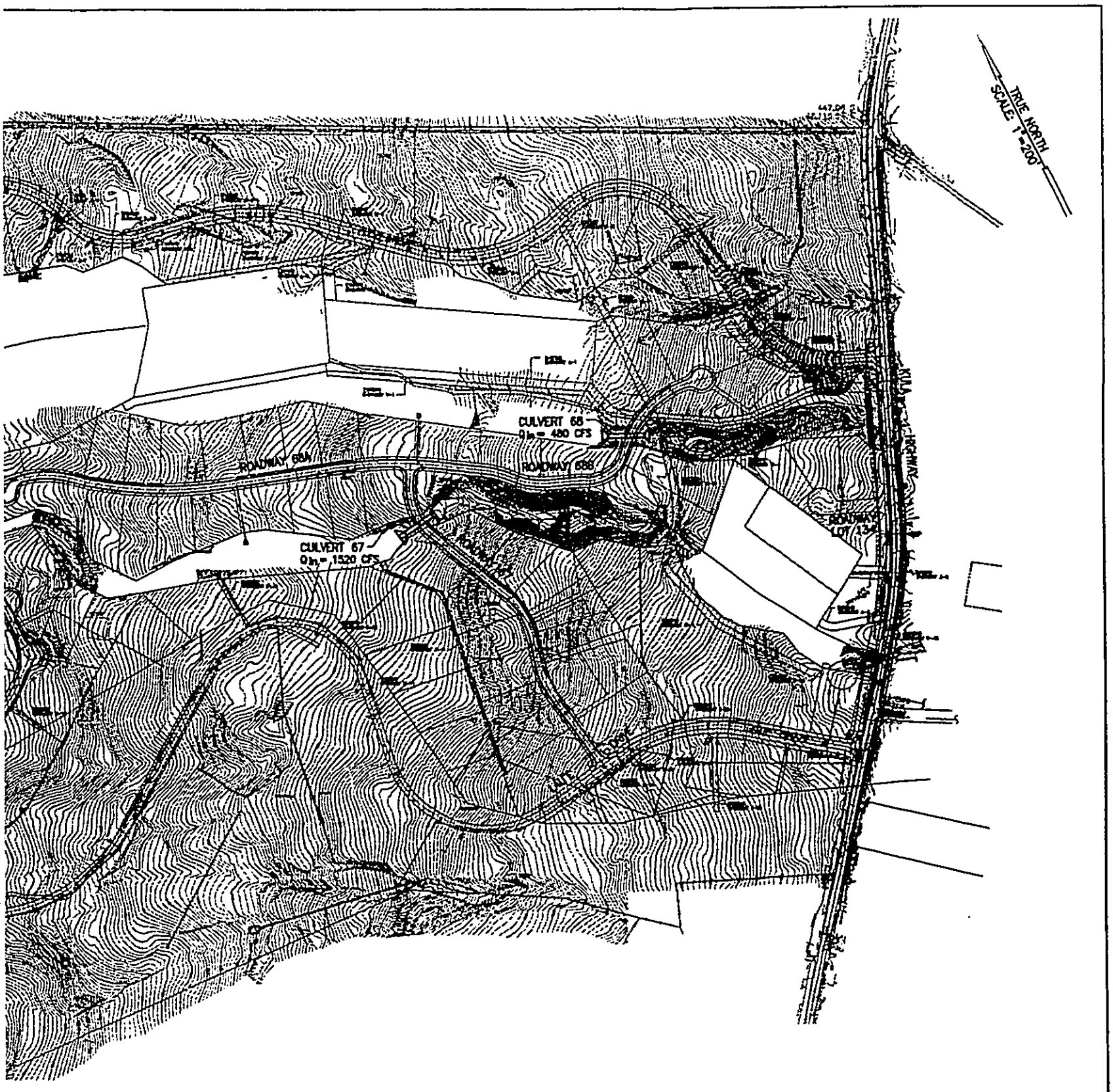


PRELIMINARY ENGINEERING REPORT
HAWAIIAN HOME LAND SUBDIVISION
WAIOHULI – HIKINA, UKA AND LOT 134
WAILUKU, MAUI, HAWAII

ATA AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

WAIOHULI UKA AND LOT 134
ON-SITE HYDROLOGY MAP

EXHIBIT
6

FN: 01-553\PER\EXH-UKA 134-DRAINAGE.dwg

RECEIVED AS FOLLOWS

FN: 01-553\Unit2\figures\FIG2-SITE-PLAN.DWG

TMK: 2nd DIV. 2-2-02:15
KAONOULU RANCH

KULA RESIDENCE
UNIT 1 SUBDIVISI
(EXISTING)

WAIOHULI UK
SUBDIVISION
(PROPOSED)

HIHI'O PL.

PUEO DR.

346

PL.

KAHILINAENAE

AHOLUA ST.

AHULUA PL.

350

NORTH

NOT TO SCALE

WAIOHULI HIKINA
SUBDIVISION
(PROPOSED)

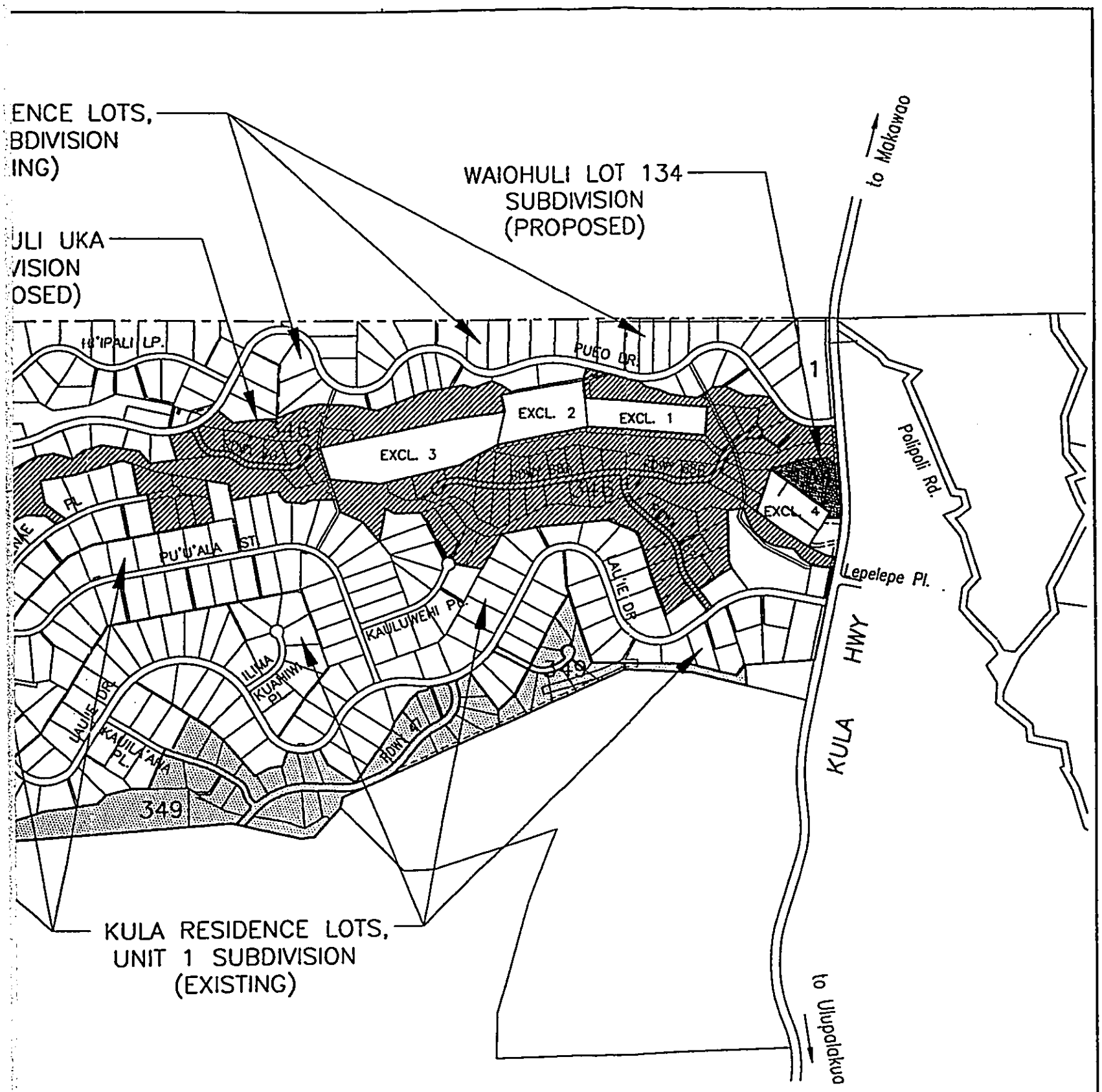
LEGEND

- WAIOHULI UKA SUBDIVISION
- WAIOHULI LOT 134 SUBDIVISION
- WAIOHULI HIKINA SUBDIVISION

HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUSTIN
ENGINEERS

RECEIVED AS FOLLOWS



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ENGINEERS, SURVEYORS • HONOLULU, HAWAII

SITE PLAN

FIGURE
2

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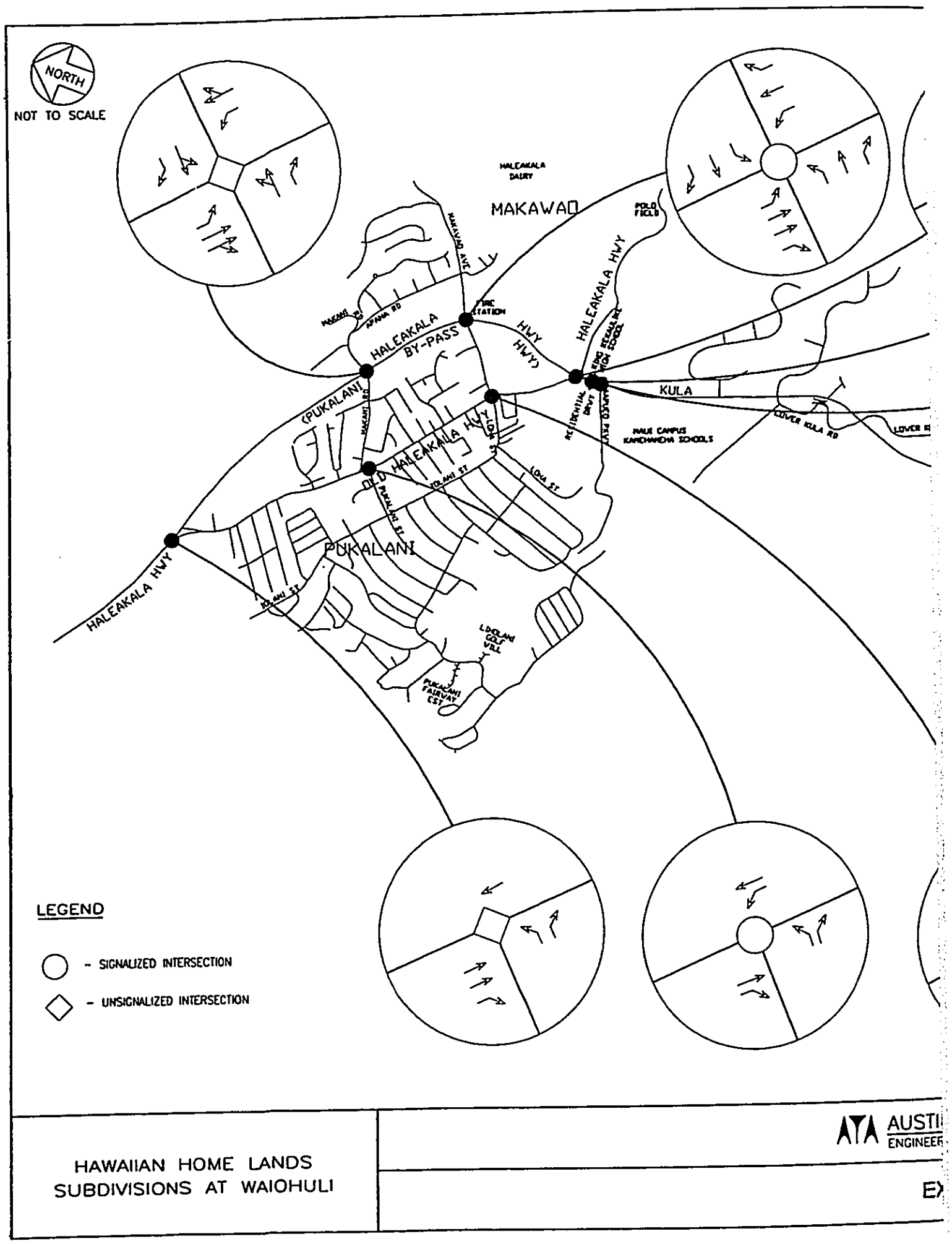

HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUSTI
ENGINEER

EX

RECEIVED AS FOLLOWS

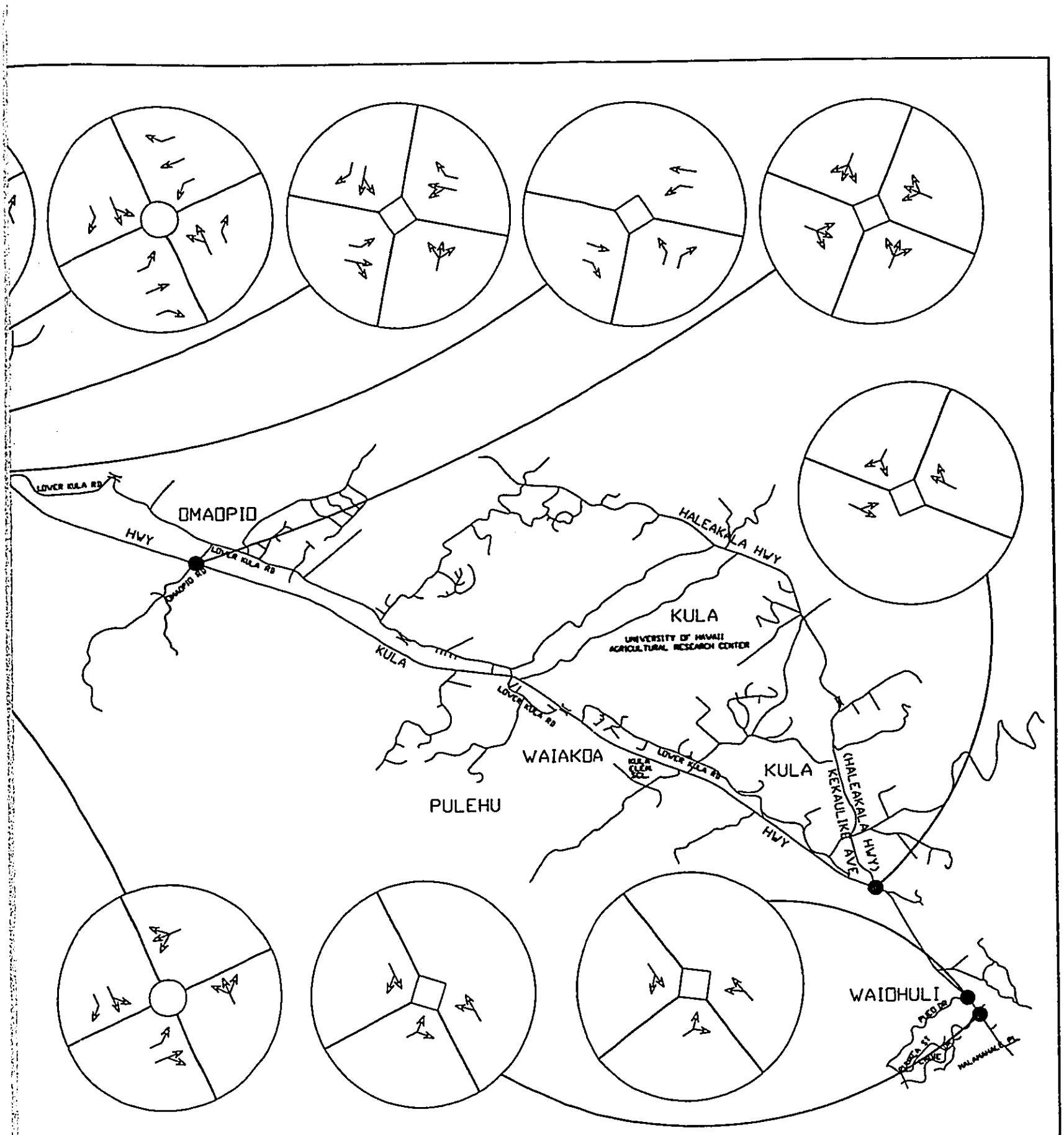

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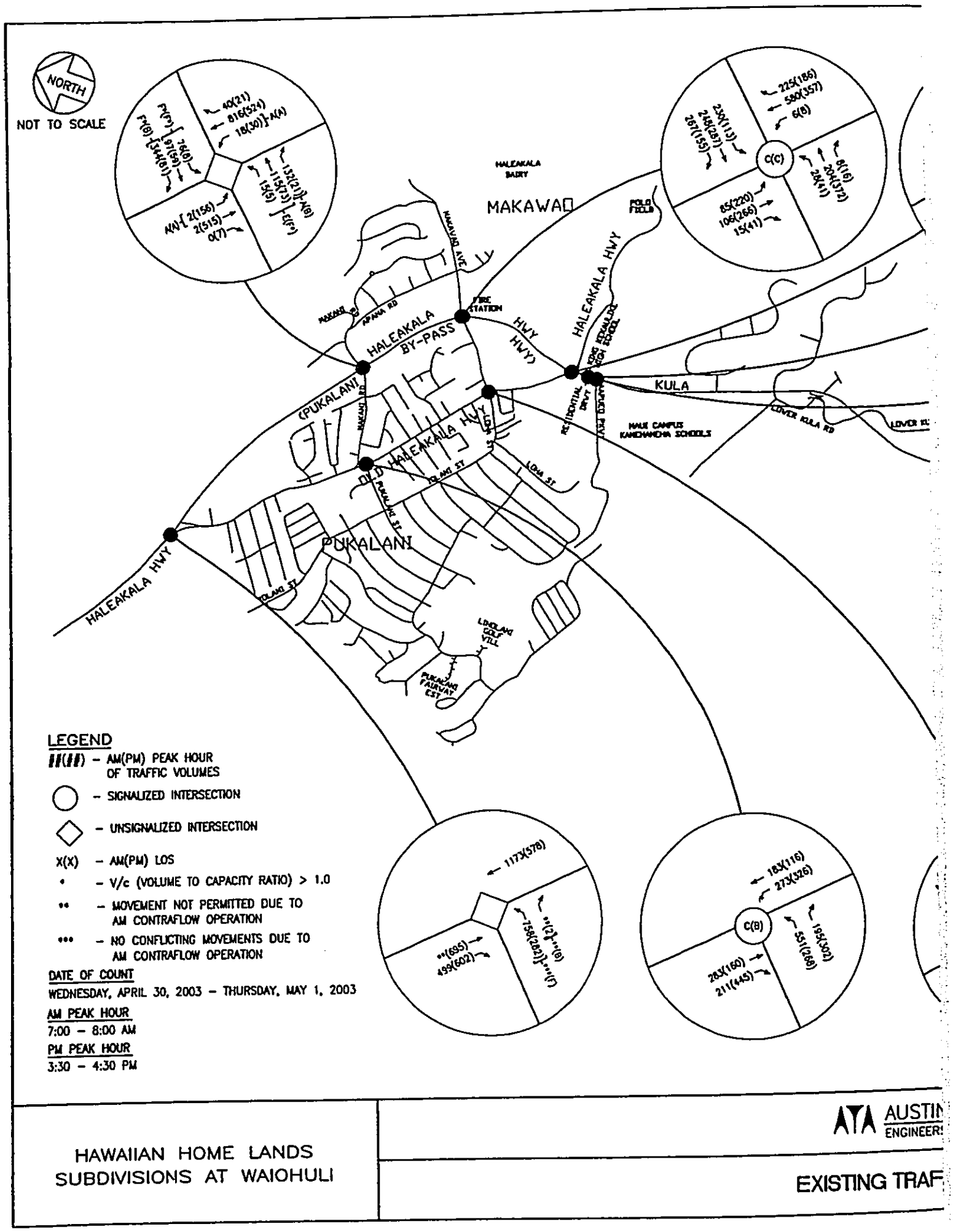
FIGURE
3

EXISTING LANE CONFIGURATION

RECEIVED AS FOLLOWS



LEGEND

II(II) – AM(PM) PEAK HOUR OF TRAFFIC VOLUMES

○ – SIGNALIZED INTERSECTION

◇ – UNSIGNALIZED INTERSECTION

X(X) – AM(PM) LOS

* – V/c (VOLUME TO CAPACITY RATIO) > 1.0

** – MOVEMENT NOT PERMITTED DUE TO AM CONTRAFLOW OPERATION

*** – NO CONFLICTING MOVEMENTS DUE TO AM CONTRAFLOW OPERATION

DATE OF COUNT

WEDNESDAY, APRIL 30, 2003 – THURSDAY, MAY 1, 2003

AM PEAK HOUR

7:00 – 8:00 AM

PM PEAK HOUR

3:30 – 4:30 PM

HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUSTIN ENGINEERS

EXISTING TRAF

RECEIVED AS FOLLOWS

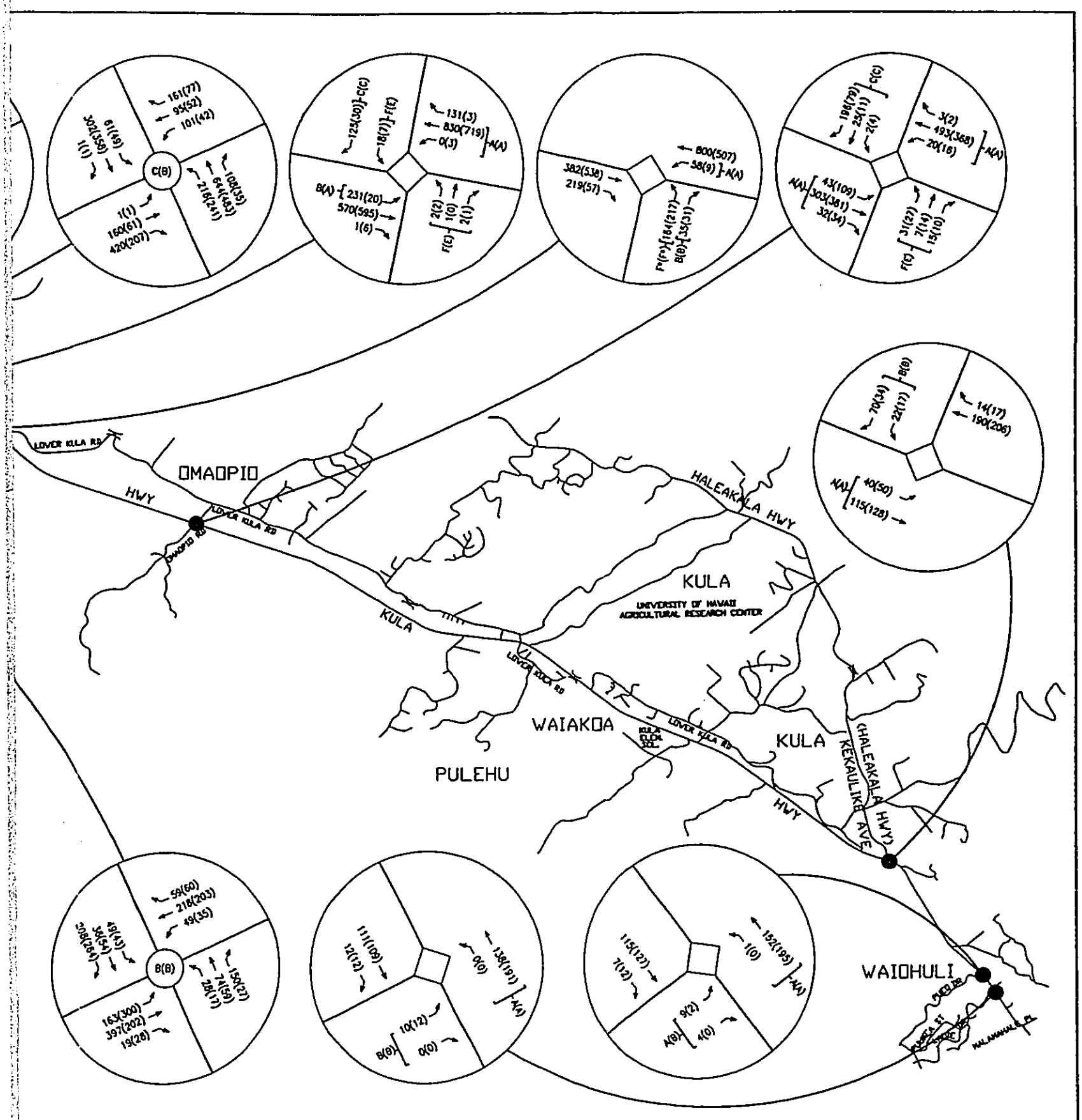


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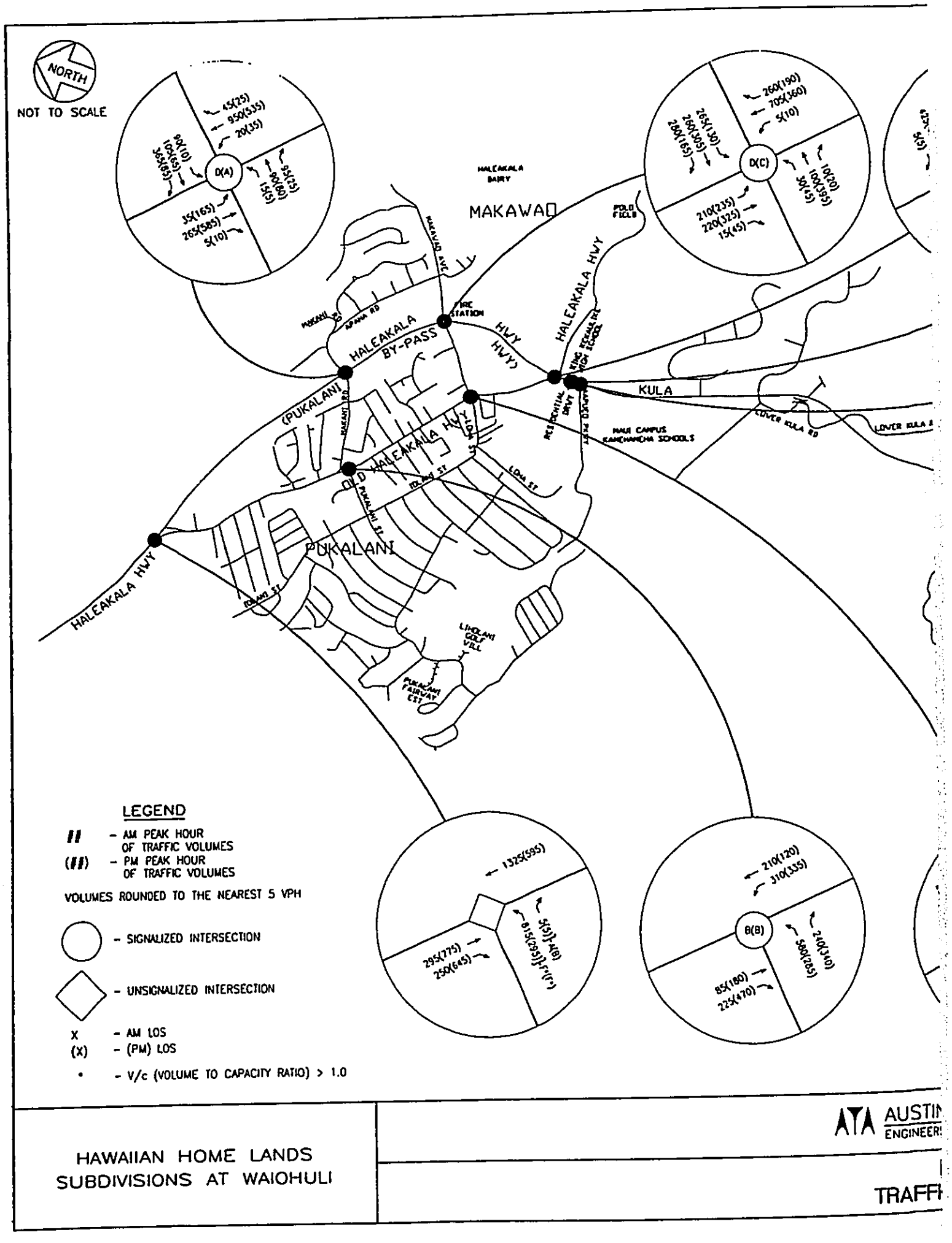
FIGURE 4

TRAFFIC VOLUMES AND LEVEL OF SERVICE

RECEIVED AS FOLLOWS



HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUSTIN ENGINEER

TRAFFI

RECEIVED AS FOLLOWS

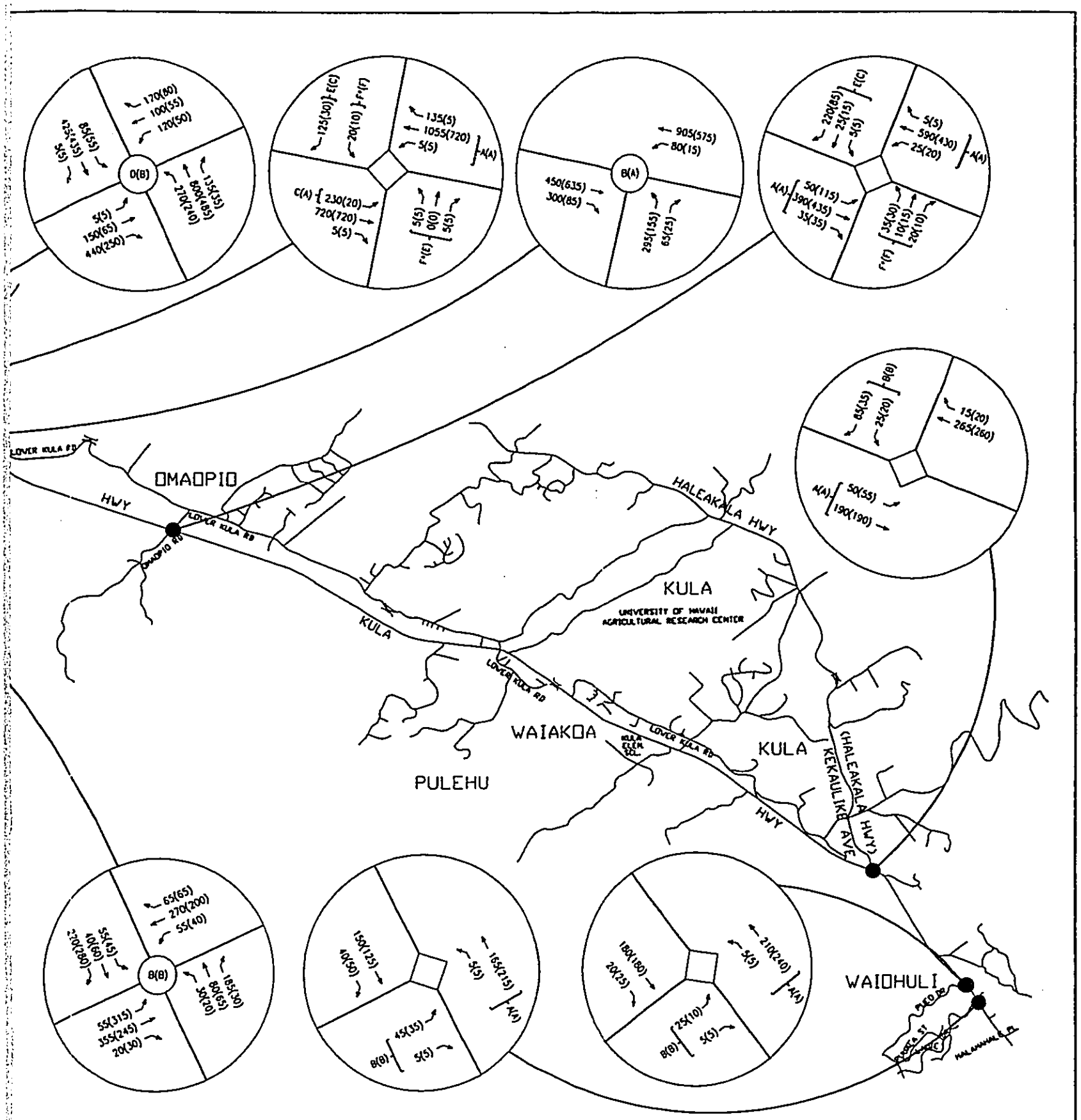


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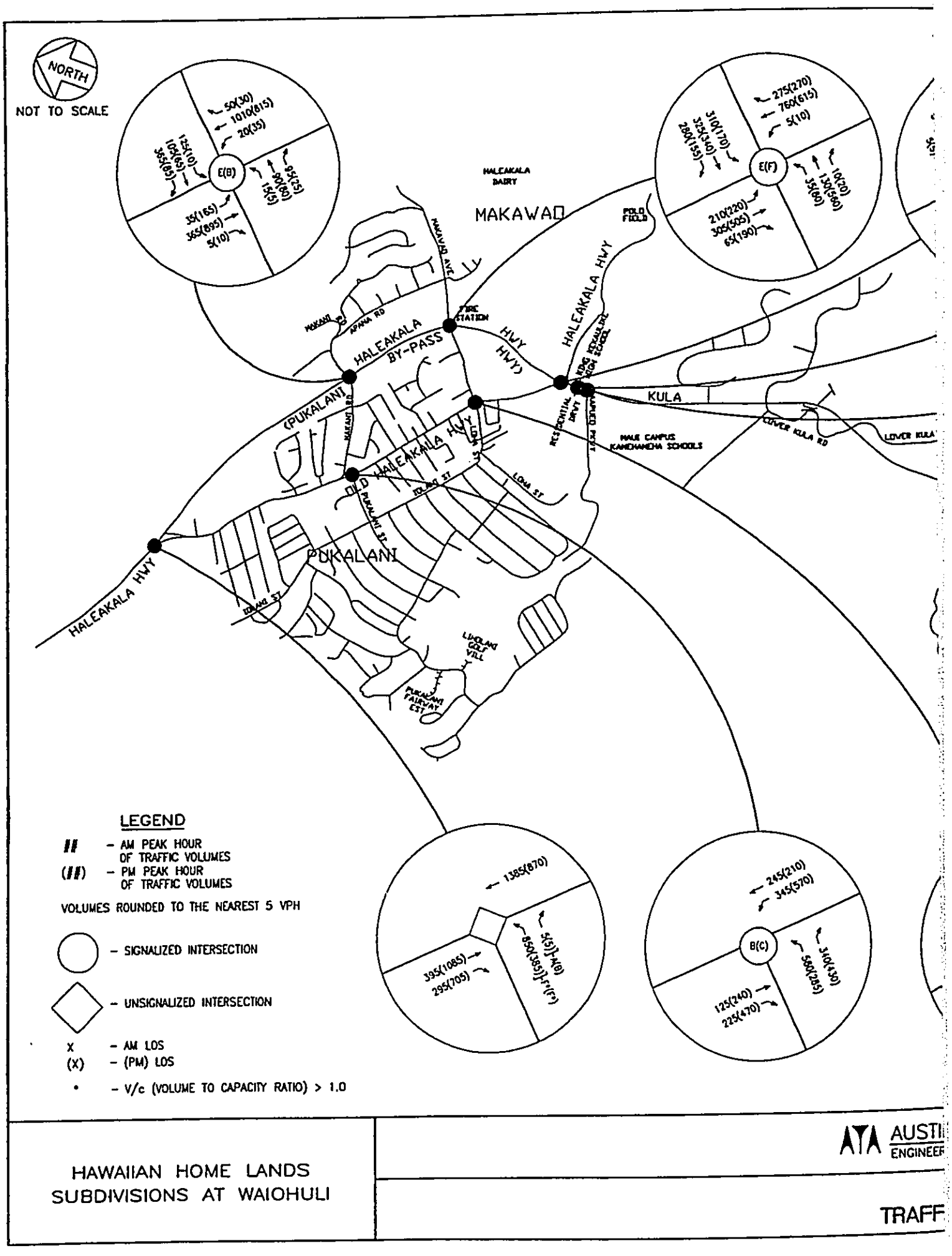
FIGURE
5

BASE YEAR 2007 SCENARIO A
RAFFIC VOLUMES AND LEVEL OF SERVICE

RECEIVED AS FOLLOWS

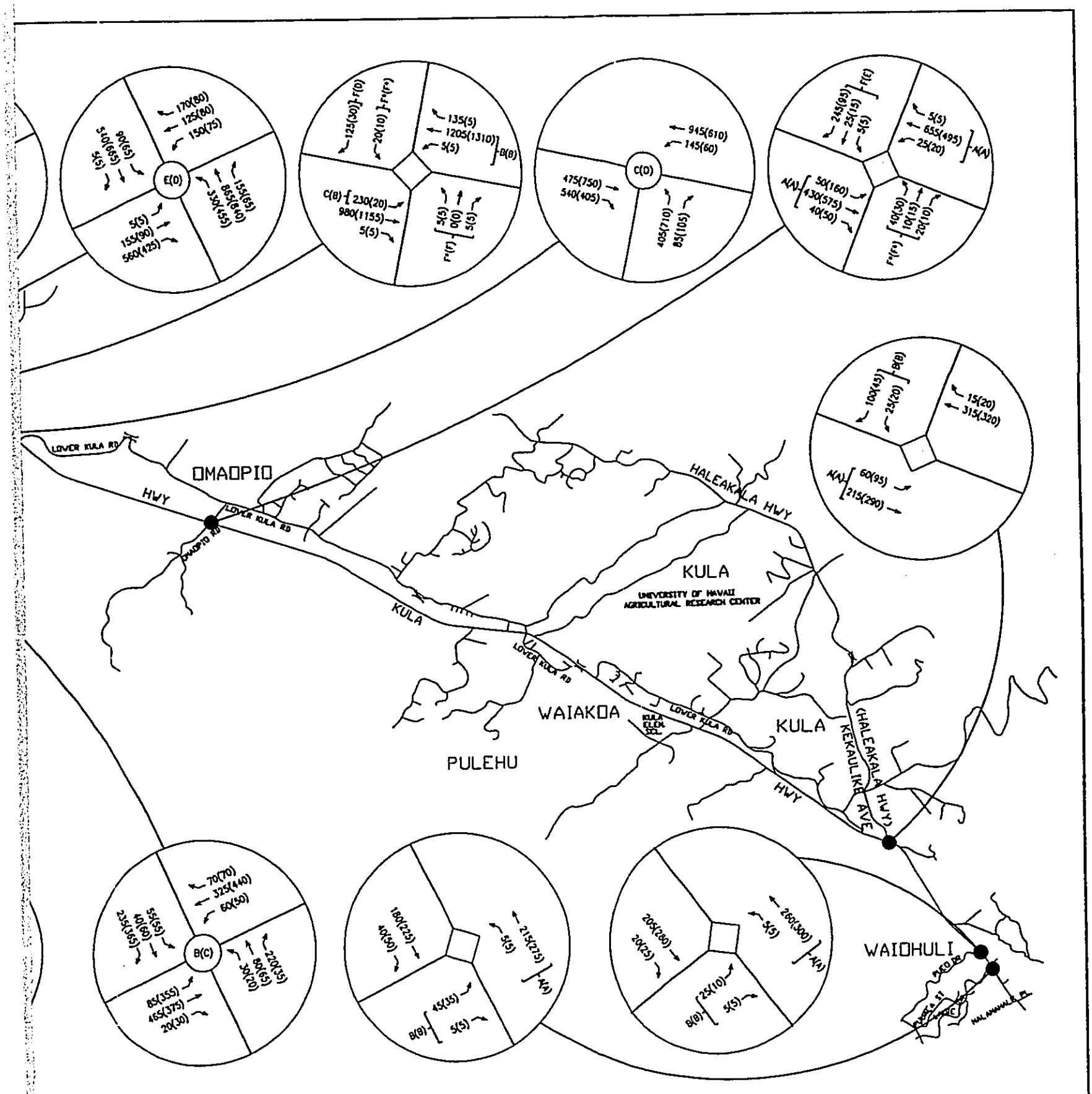


HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUSTI
ENGINEER

TRAFF

RECEIVED AS FOLLOWS

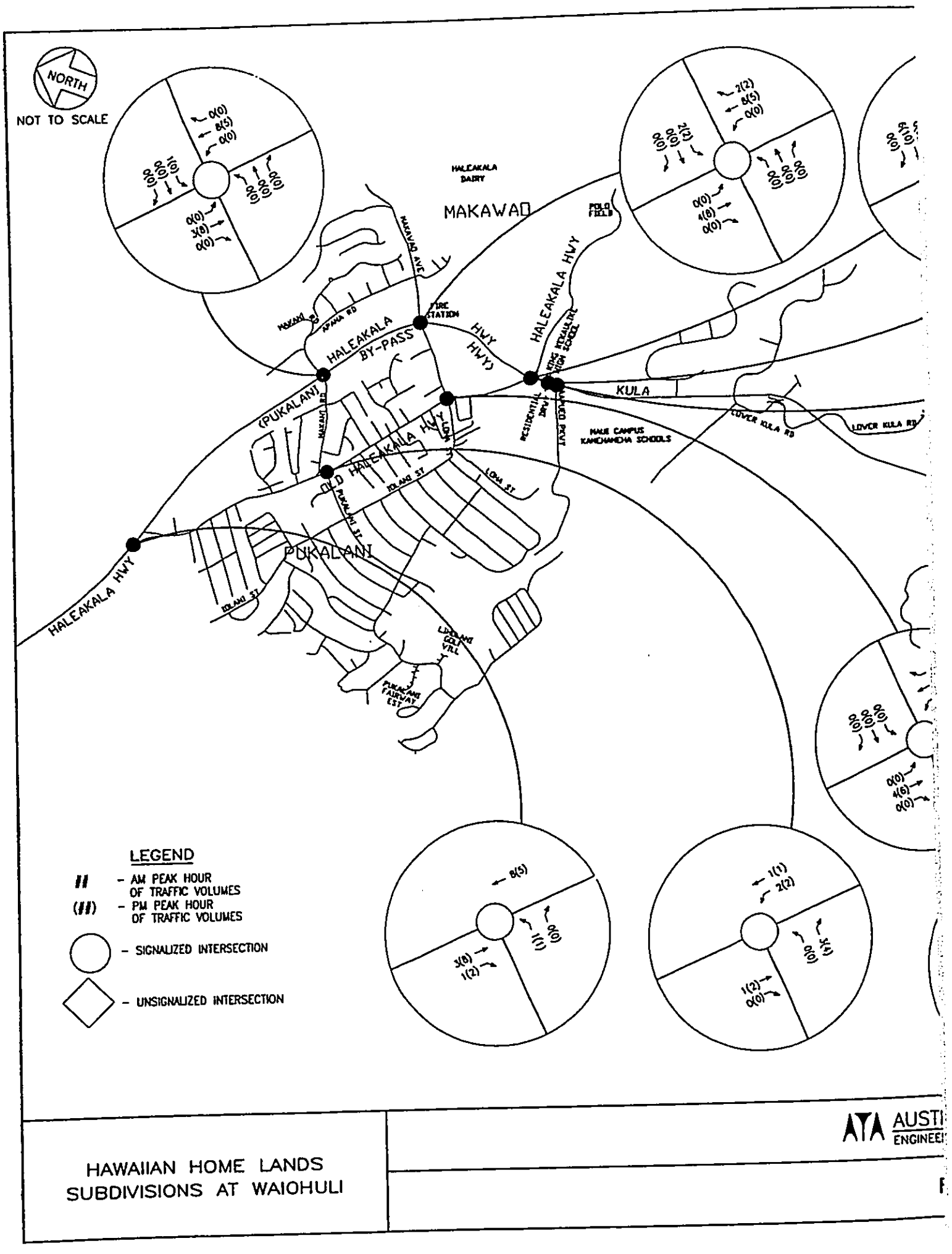


AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

FIGURE 6

BASE YEAR 2007 SCENARIO B
TRAFFIC VOLUMES AND LEVEL OF SERVICE

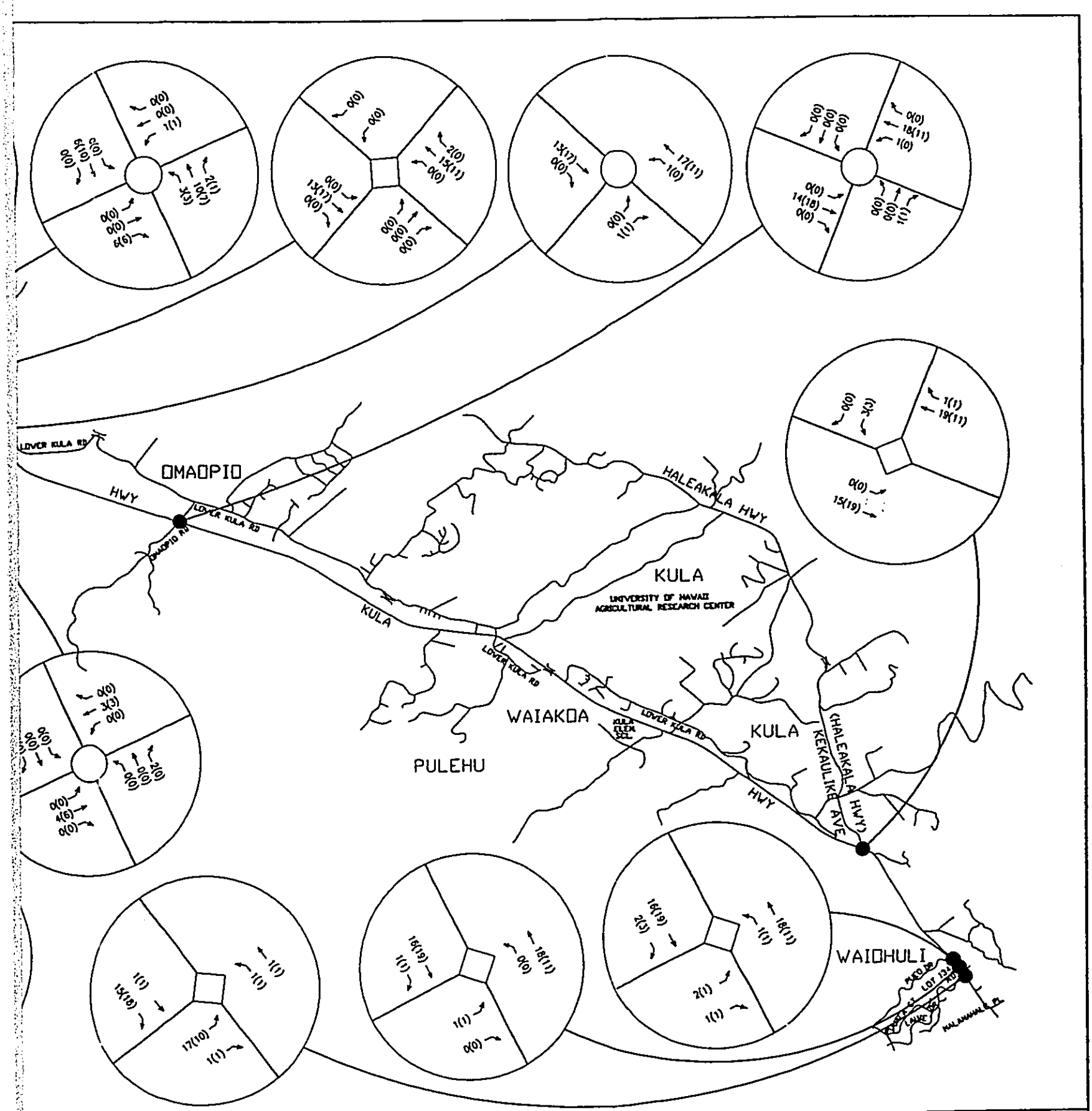
RECEIVED AS FOLLOWS



HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

ATA AUSTI
ENGINEE

RECEIVED AS FOLLOWS



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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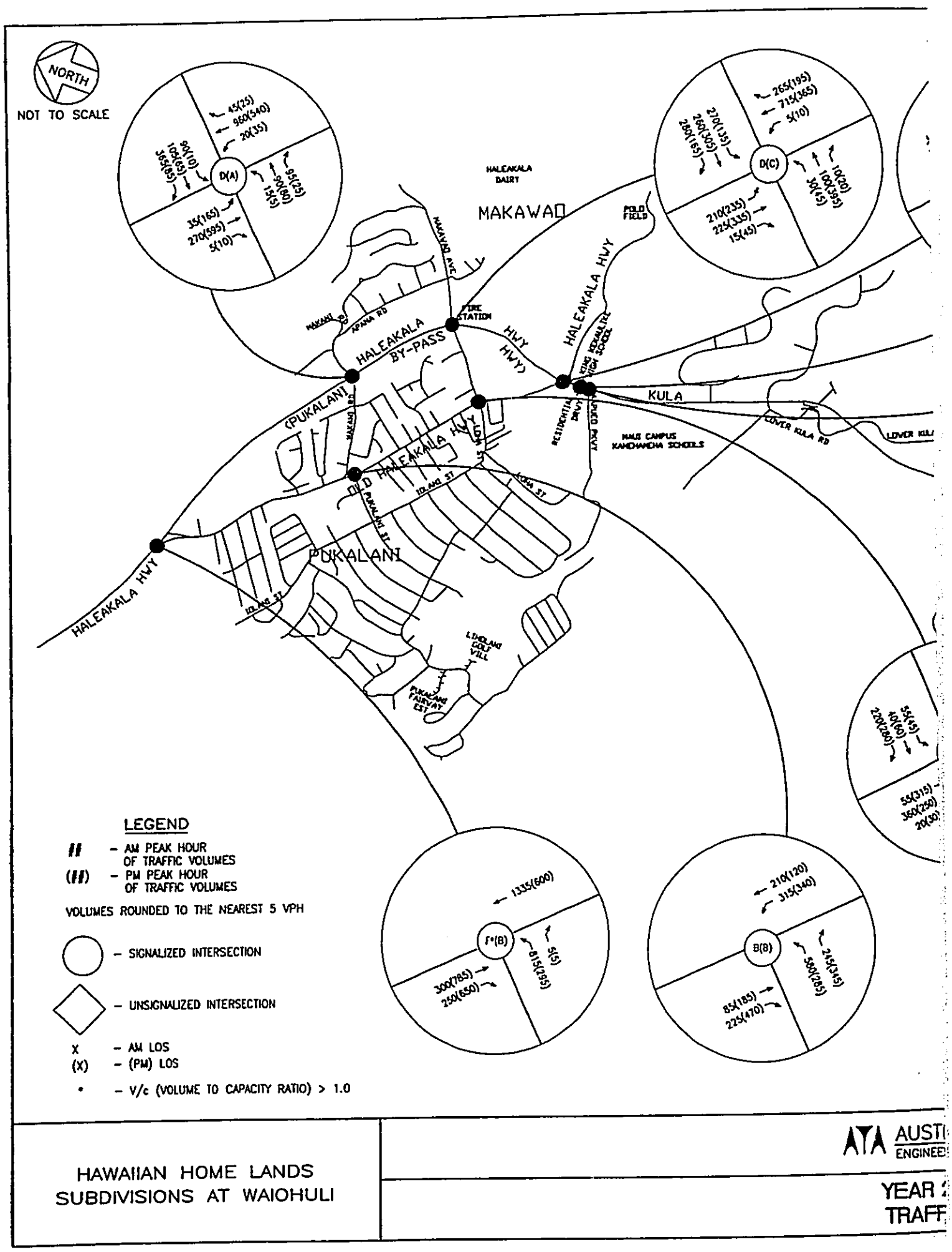
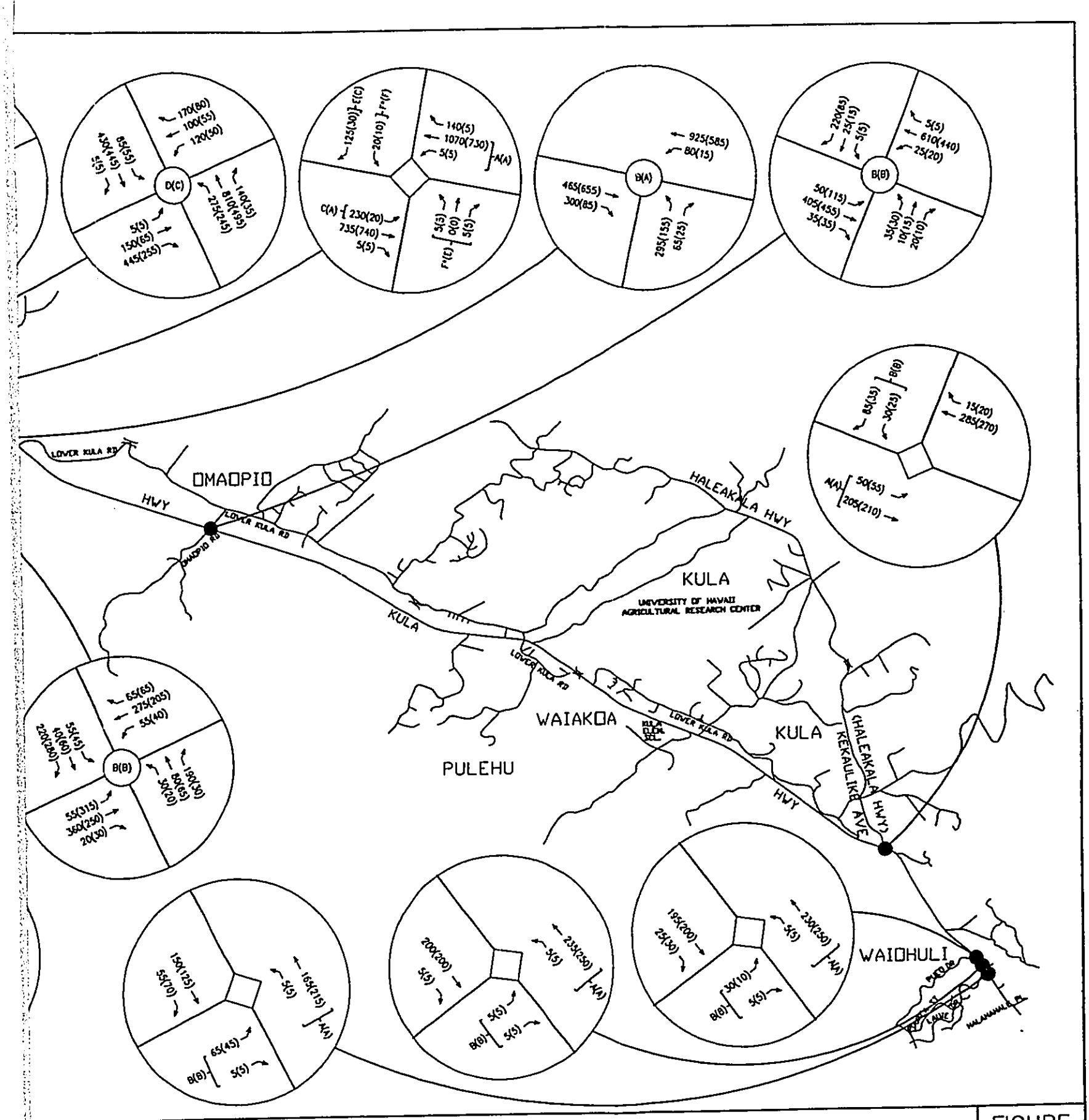
FIGURE 7

PROJECT-GENERATED TRAFFIC

RECEIVED AS FOLLOWS



RECEIVED AS FOLLOWS



AUSTIN, TSUTSUMI & ASSOCIATES, INC.
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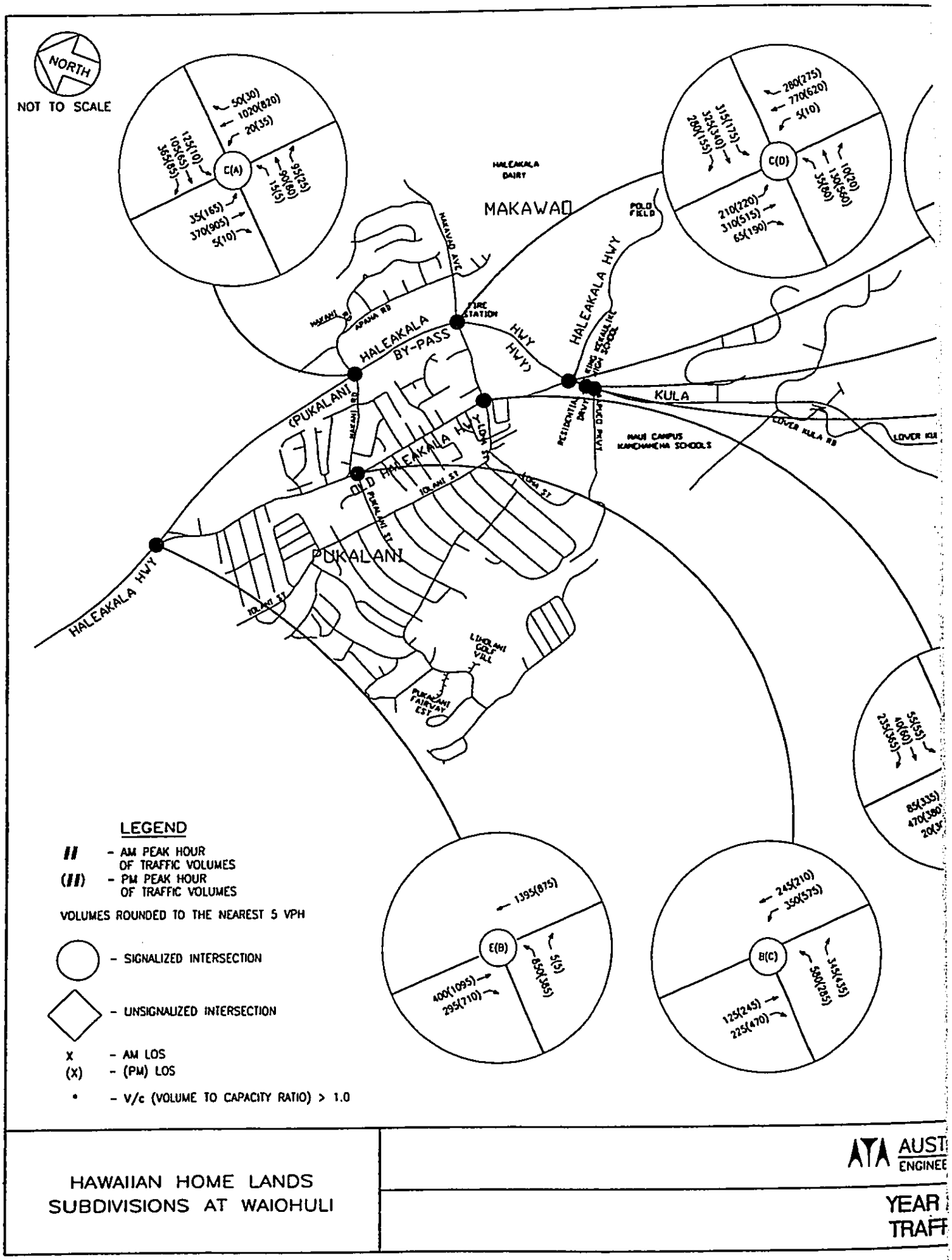
FIGURE 8

YEAR 2007 SCENARIO A WITH THE PROJECT
TRAFFIC VOLUMES AND LEVEL OF SERVICE

RECEIVED AS FOLLOWS



HAWAIIAN HOME LANDS
SUBDIVISIONS AT WAIOHULI

AUST
ENGINEE

YEAR
TRAFF

RECEIVED AS FOLLOWS

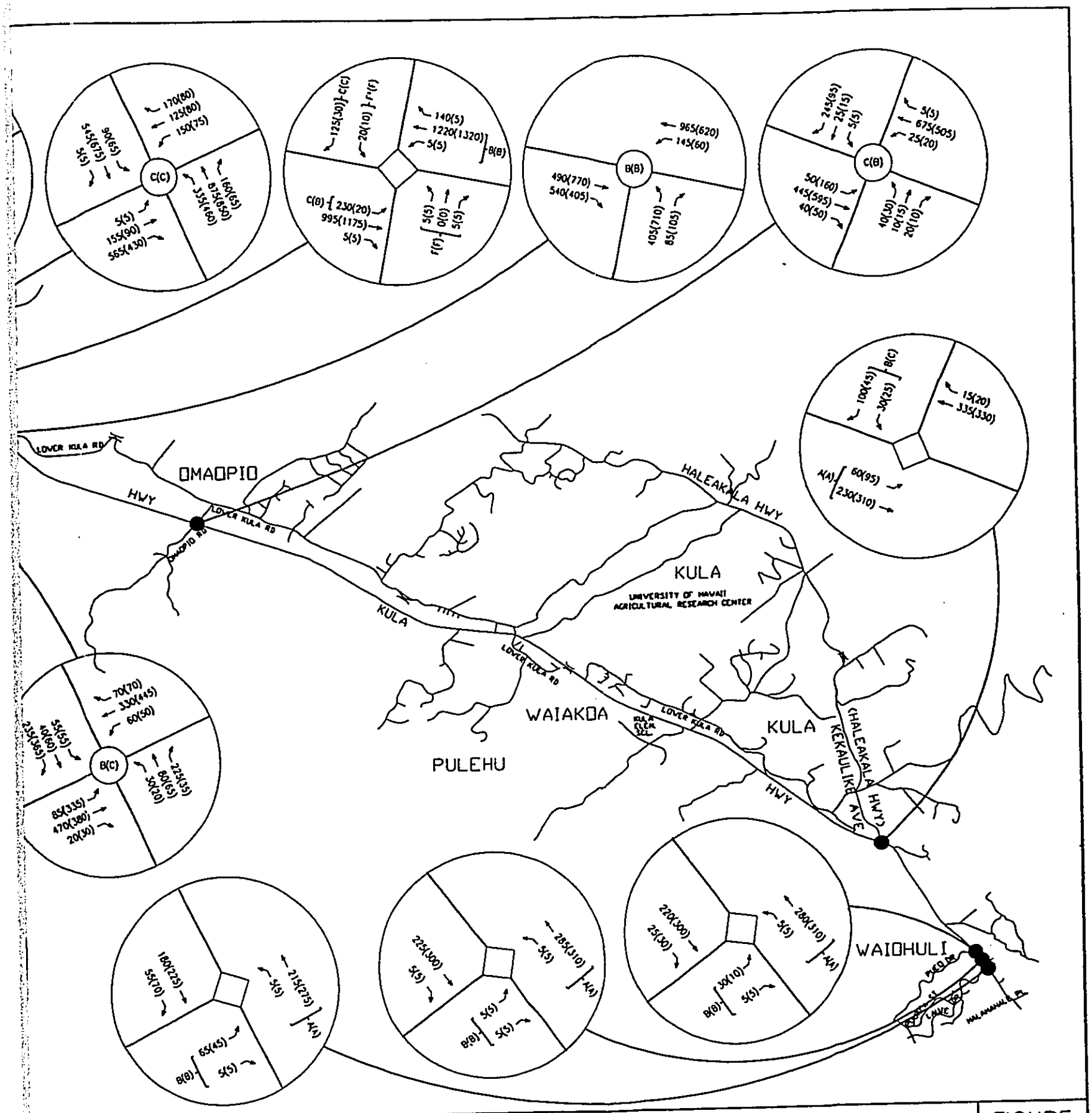


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FIGURE 9

YEAR 2007 SCENARIO B WITH THE PROJECT
TRAFFIC VOLUMES AND LEVEL OF SERVICE