

APPENDIX E.

Cultural Impact Assessment

KAHOMA

(Thin or Hollow)

FINAL REPORT

TMK (2) 4-5-10: parcels 5 & 6 which consist of a 16.8-acre parcel. This Proposed Project includes twelve special needs units and sixty single family residential lots for Kahoma Employee Special Needs.

Prepared for:

WEST MAUI LAND COMPANY, INC.

33 Lono Ave, Suite 450

Kahului, Maui, Hawaii 96732

Contact Heidi Bigelow

Ph (808) 877-4202

Fax (808) 877-9409

Prepared by:

HANAPONO

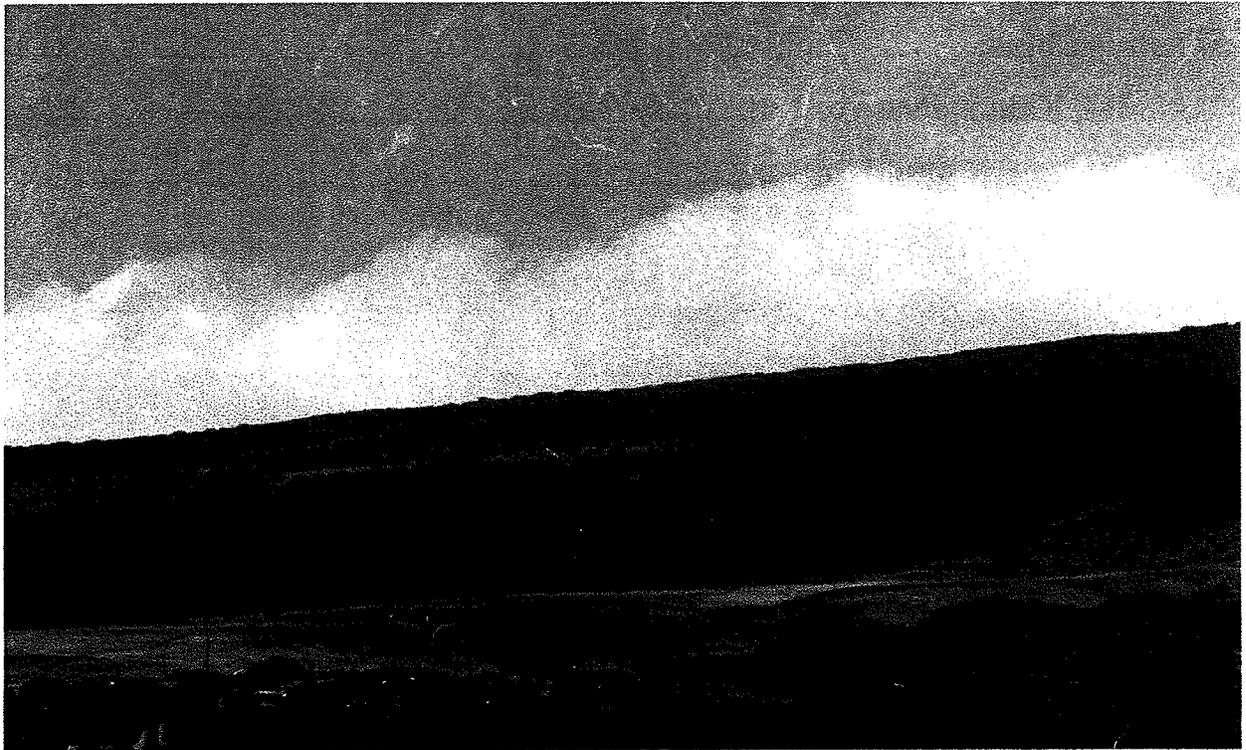
2275 Apala Place

Haiku, Maui, Hawaii 96708

Keli'I Tau'a & Kimokeo Kapahulehua

Ph & Fax (808) 572-6162

Kimokeo Cell (808) 276-7219

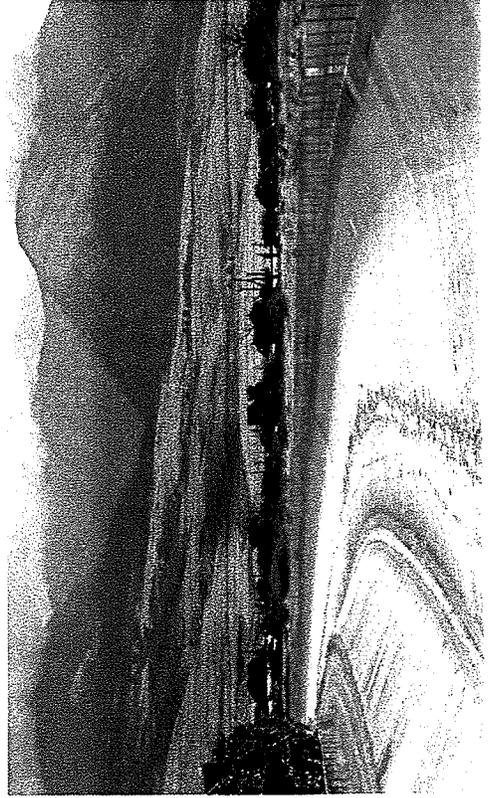
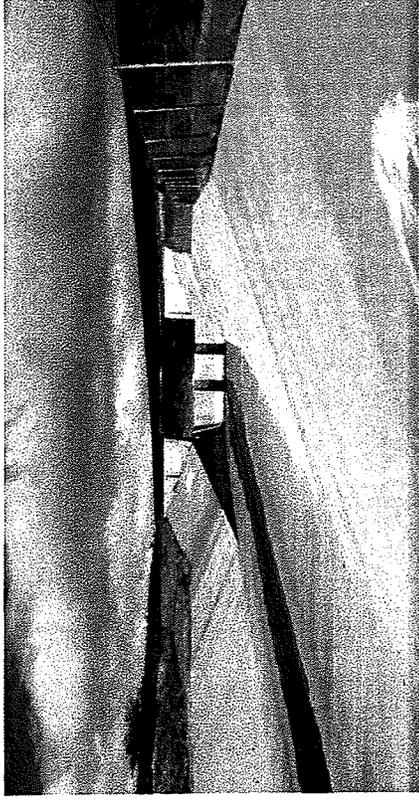
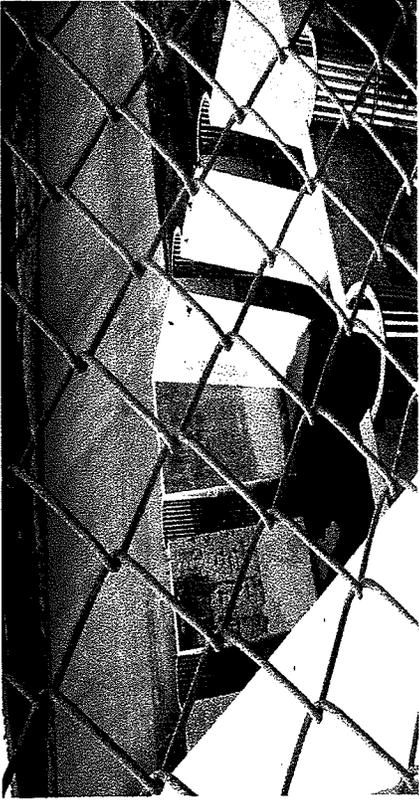


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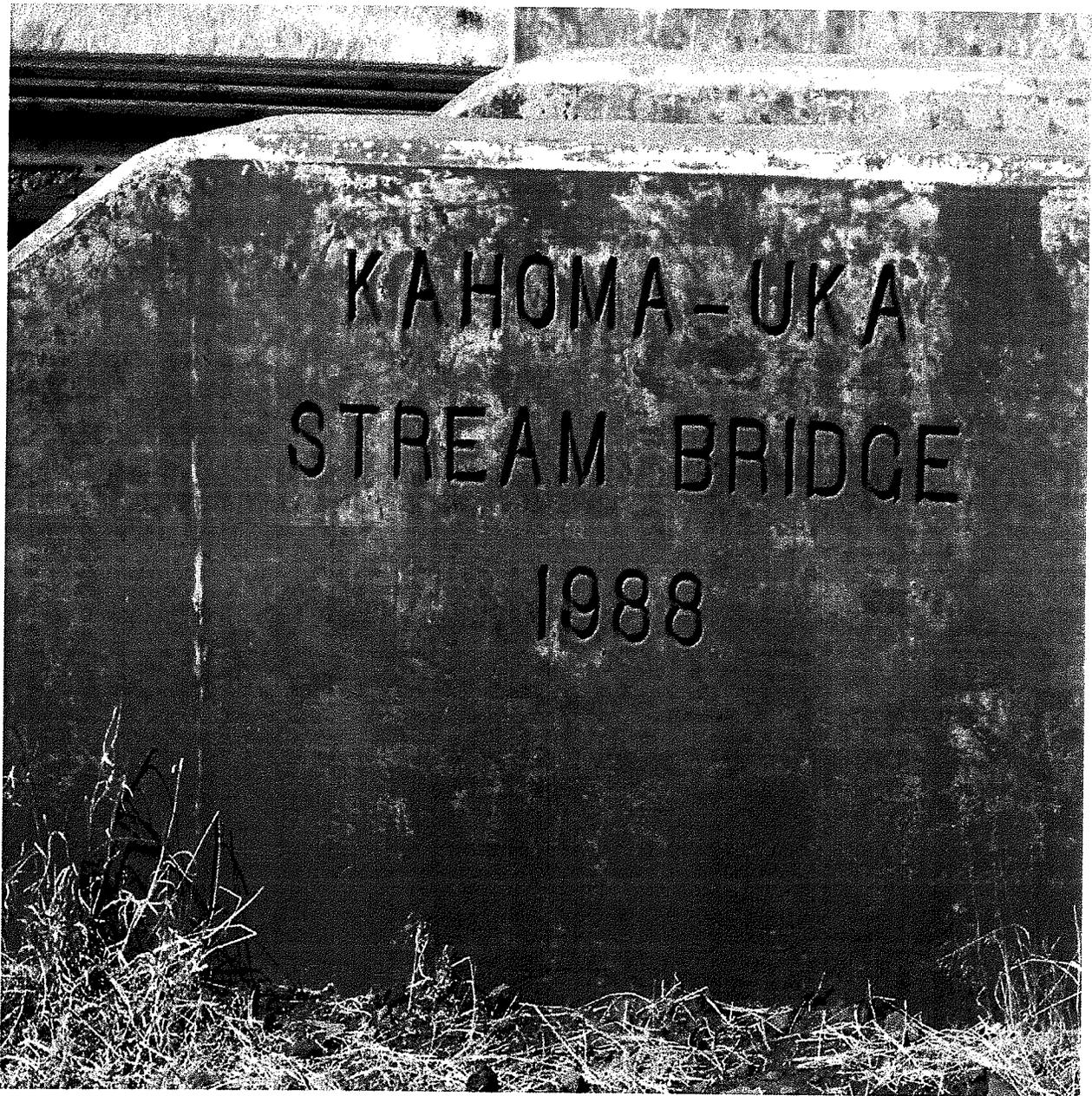
(Thin or Hollow)

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Kahoma Stream Dam Mauka-Makai



Flood Dirt Overflow 1988 on
White Bridge before Flood
Control Project 1990



Kahoma Project Site- Stream
Pioneer Mill Smoke Stack
Background -Boats,Moloka'i



Scope

The scope of this report will be to compile various historical, cultural and topographical accounts and facts of the Kahoma area and its adjacent ahupua'a (land divisions). The Kahoma ahupua'a may be clearly identified from the ocean with Mala Wharf as its identifying landmark and moving mauka (upland) with the Kahoma Stream serving as our guide into the valley.

Kahoma, as part of West Maui, has remained obscure all these years since Central Lahaina, the first capital for the Hawaiian Islands, was the focal point. Lahaina was attracting all the popular attention with Hawai'i's Royalty; such as King Kamehameha's one year occupancy; his wife's, Queen Ka'ahumanu and Queen Keopuolani, last years; King Kamehameha III's residency and the rowdy waterfront during the whaling years. Meanwhile, Kahoma was receiving periodic negative publicity with its river banks overflowing, causing major floods in the lowlands of Lahaina, Mala, and Hanaka'o'o. Today, the new Kahoma Flood Control Project aides in the control of future floods and will not be a distraction with the building of the Kahoma Subdivision, a project consisting of Employee, Special Needs and Market homes.

Introduction

Hana Pono, under contract to West Maui Land Company, Inc. (WMLC) has conducted a Cultural Impact Assessment (CIA) for WMLC, Inc.'s proposed Kahoma Subdivision on a 16.8-acre parcel between Kahoma Flood Control Channel and a residential area in Kahoma, Lahaina, Maui TMK: (2) 4-5-10: parcels 5 & 6. It includes twelve special needs units and sixty single family residential lots approximately 6,000 square feet in size.

The CIA was conducted in accordance with the State of Hawai'i Office of Environmental Quality Control (OEQC) Guidelines for Assessing Cultural Impacts {1997}, and includes oral interviews with knowledgeable consultants of Kahoma and its surrounding areas and archival research.

Lahaina's Borders

According to author researcher Elspeth P. Sterling of the book "Sites of Maui", Lahaina is part of the large moku (section) at West Maui stretching from South Ukumehame to the borders of Hanaka'o'o, just before Ka'anapali. The Ka'anapali ahupua'a continues around North Maui and includes the district called Kahakuloa.

Kahoma's Place in Lahaina's Legacy

Kahoma, a section of the 'Alamihi ahupua'a, is a small part of the many isolated but rich valleys located in the middle of the large Lahaina moku (section). Lahaina's shape was like a rounded shield that just finished its eruption laying prey to very aggressive erosion all along the mountainous terrain. Exposure to erosion developed Kahoma's steep cliffs, ridges and a water outlet that enriched the wetland areas mauka (upland) and makai (lowland) of Kahoma.

Kahoma is on the kona side of the island of Maui. The description of kona is hot, dry and windy. During the winter months it is common for the trade winds to cease, producing heavy humidity, sticky weather and storms from the south.

Lahaina was the punana (nest) of the West Maui chiefs. In the great battle between two powerful chiefs, Kauhi'aimoku-a-kama and Kamehameha-nui, the former chief was able to seize and collect from 'Alamihi ahupua'a sufficient food to support his army's march across the island (Kamakau, 73). It suggests that 'Alamihi ahupua'a was capable of providing a rich resource for needy chiefs and visitors. Handy & Handy note that along these southwest coast lands of West Maui mountains beginning at Olowalu and continuing through Launiupoko, Laupakanui, Waine'e and Lahaina onward to small terraced valleys of Kahoma, Honokawai, Honolua and Honokahau were taro lands irrigated from the flowing streams and that Lahaina itself was flanked by excellent fishing grounds (Kamakau 272).

Early accounts of Lahaina by a famous missionary whose proselytizing efforts in the South Pacific Islands and brief moments in Hawai'i were penned by William Ellis.

At day-break, on the 4th, we found ourselves within about four miles of Lahaina, which is the principal district of Maui, on account of its being in the general residence of the chiefs, and the common resort of ships that touch at the island. The appearance of Lahaina from the anchorage is singularly romantic and beautiful. A fine sandy beach stretches along the margin of the sea, lined for a considerable distance with homes, and adorned with shady clumps of koa trees, or waving groves of coconuts. The level land of the whole district, for about three miles, is one continuous garden, laid out in beds of taro, potatoes, yams, sugar-cane, or cloth-plants (wauke). The lowly cottage of the farmer is seen peeping through the leaves of the luxuriant plantain and banana tree, and in every direction white columns of smoke ascend, curling up among the wide-spreading branches of the bread-fruit tree. The sloping hills immediately behind, and the lofty mountains in the interior, cloth with verdure to their very summits, intersected by deep and dark ravines, frequently enlivened by waterfalls, or divided by winding valleys, terminate the delightful prospect (Ellis, 76).

Pu'u Kukui's Wealth

The great wealth of this area stems from the waterways flowing from Pu'u Kukui, the highest point on West Maui at 5,788 ft. above sea level. Pu'u Kukui receives about 400 inches of rain a year while rain is scarce along the coast. From the abundant Pu'u Kukui water source, many streams feed the valleys below. "Uwe ka lani, ola ka honua." When the heavens weep, the earth will grow.

The Kahoma Stream

The Kahoma Stream is an intermittent stream originating in the West Maui Mountains at the base of Kaho'olewa Ridge which joins up with the tributary Kahana Stream close to the Lahainaluna High School elevation. Collectively, the streams provided a powerful single flowing force that flooded the lowland areas of Lahaina and Ka'anapali many times over.

U.S. ARMYCORP OF
ENGINEERS
HONOLULU DISTRICT
1990



Although Pu'u Kukui provides water outlets for many other streams, Kahoma and Kahana, being the closest direct waterway to the ocean, sent a destructive water force flowing which deemed necessary for the U.S. Army Corps of Engineers (USACE) to address the repetitive excessive flooding during the winter months in Lahaina. The interviewed consultants (Kupuna Joe Lai & Keola Sequeira), stated that it wasn't unusual to see the old cannery, now the Lahaina Cannery Mall, flooded. The USACE completed the Kahoma Stream Flood Control Project (KSFCP) in 1990 to prevent further flooding (Kanalei Shun 1991).

The waiwai (richness) of West Maui stemmed from the abundant flow of fresh water from Ka Mauna Kahaawai (West Maui Mountains). The fresh water fed the food crops mauka and makai. The eroded soils at the mouths of the valleys provided optimum conditions with the available water flow to irrigate the Hawaiians wet land taro (kalo), paper mulberry (wauke), bananas (mai'a), and other food crops. Later, the sugar and plantation owners used the established irrigation system to water their crops which we can see even today at most of the ahupua'a (Hammon-Kahoma Stream Study: Bishop Museum 1973).

Streams of Pu'u Kukui

From the south, Pu'u Kukui provided water for Manawainui Gulch, Ukumehame Gulch, Olowalu Stream and Launiupoko Stream. Closer to Lahaina are Kaua'ula Stream, Kanaha and Kahoma Stream. North from Lahaina are Honokowai Stream, Kahana Stream, Mailepai Stream, Honokahua Stream, Honolua Stream, Honokohau Stream, and lastly Kahakuloa Stream rolling down on the extreme north side of the island all originating from Pu'u Kukui.

With the present town structure in Lahaina, the lay of the land clouds our vision on how Lahaina used to be. In ancient times, Lahaina was surrounded by wetlands from the ocean shoreline up to present Malu'ulu'olele Park. Wetland taro occupied much of the area mauka and makai as late as the early 1900's.

Fornander tells an interesting Hawaiian love story about E'eke and Lihau, two prominent landmarks in the uplands of Lahaina ahupua'a next door to Kahoma. E'eke and Lihau had been married for some time when E'eke became entangled. He saw a beautiful maiden from Kaua'ula named Pu'uwaiohina, the younger sister of Lihau and he committed adultery. E'eke was punished for his unfaithfulness by their god Hinaikauluau turning E'eke to a mountain, Pu'uwaiohina a mountain ridge while big sister Lihau became the hill in back of Olowalu. Pu'uwaiohina is the prominent mountain ridge at Kaua'ula today (Fornander, 534).

Lahaina Shelters Ships

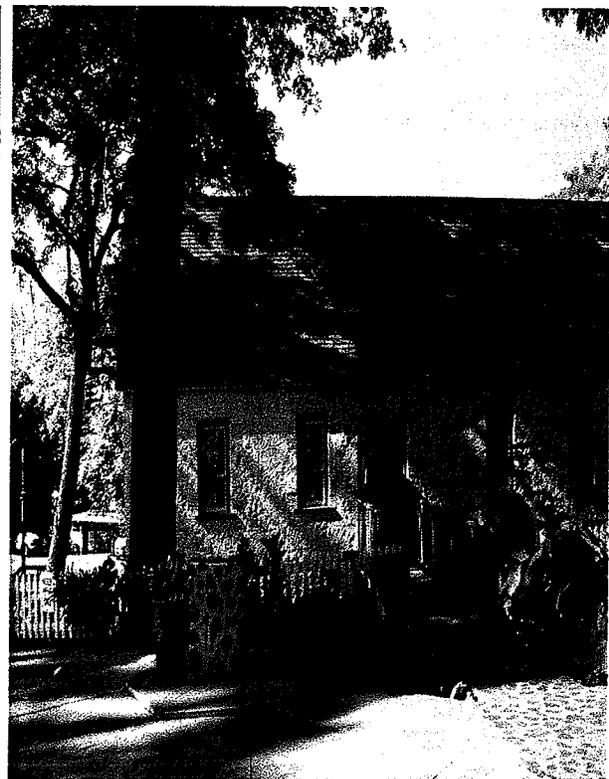
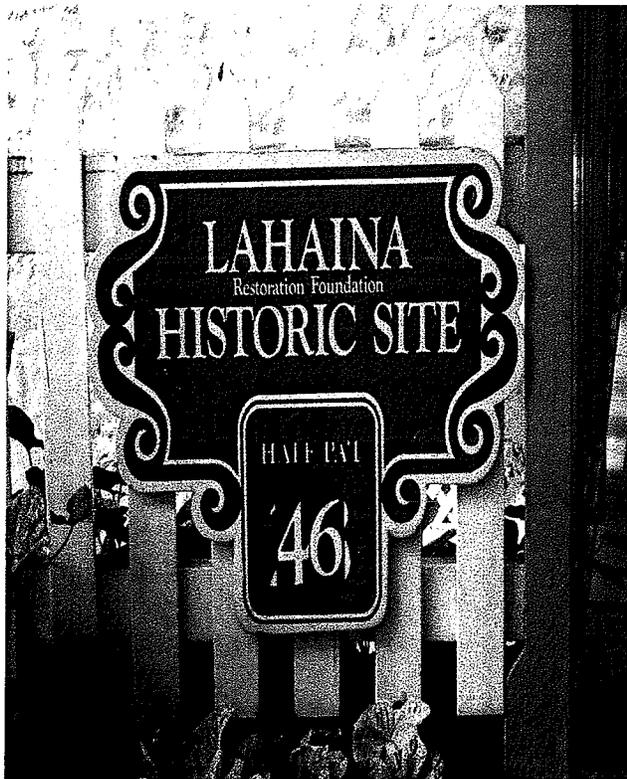
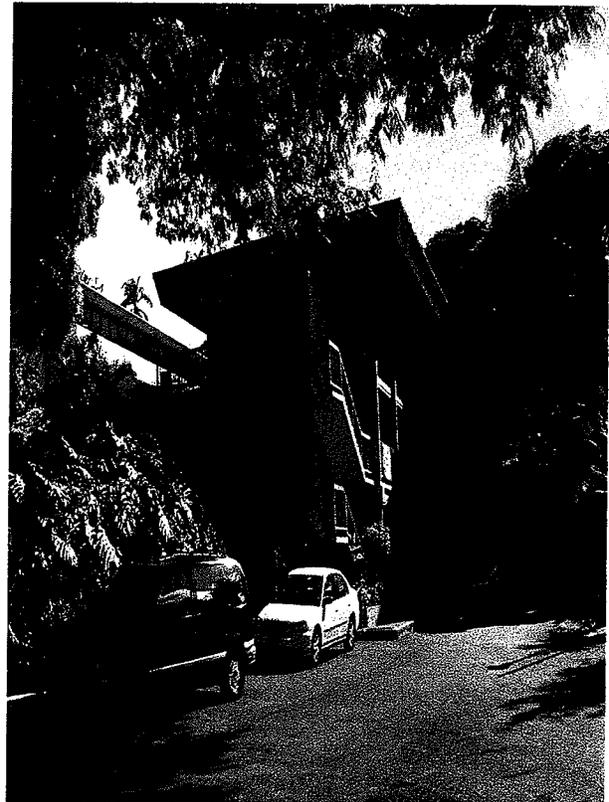
The surrounding islands of Kaho'olawe, Molokini, Lana'i and Moloka'i provided Lahaina with desirable sheltered conditions for conquering chiefs and their large sailing canoes. Later, the whaling ships found the attractive conditions very suitable for them to anchor in Lahaina and remain throughout the winter months. Even today, it is not unusual to see two or more large ocean cruise ships and many other smaller boats in the same location where the whaling ships used to anchor.

One of the interviewed consultants got teary-eyed when he shared his childhood stories about seeing the canoes riding right up to the shoreline before the reconstruction of modern day Lahaina. He said that he remembered the canoes coming into the wet land area at 505 Front Street

HISTORICAL SITES-Lahainaluna

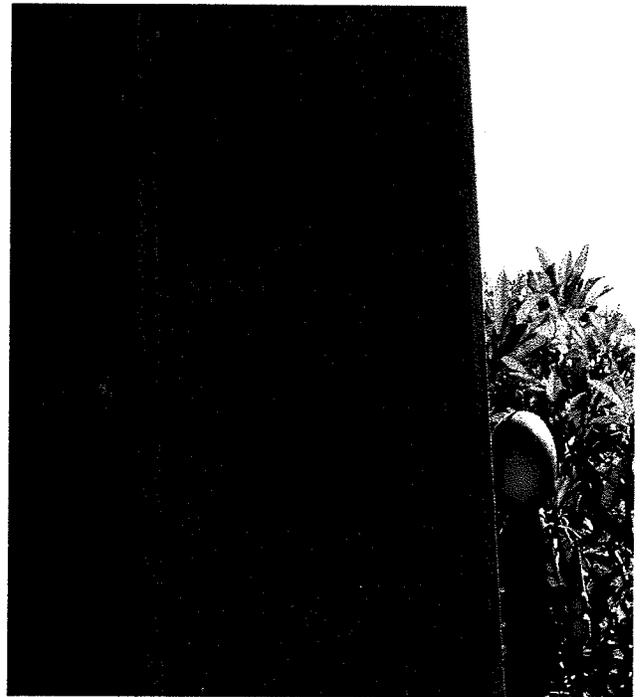
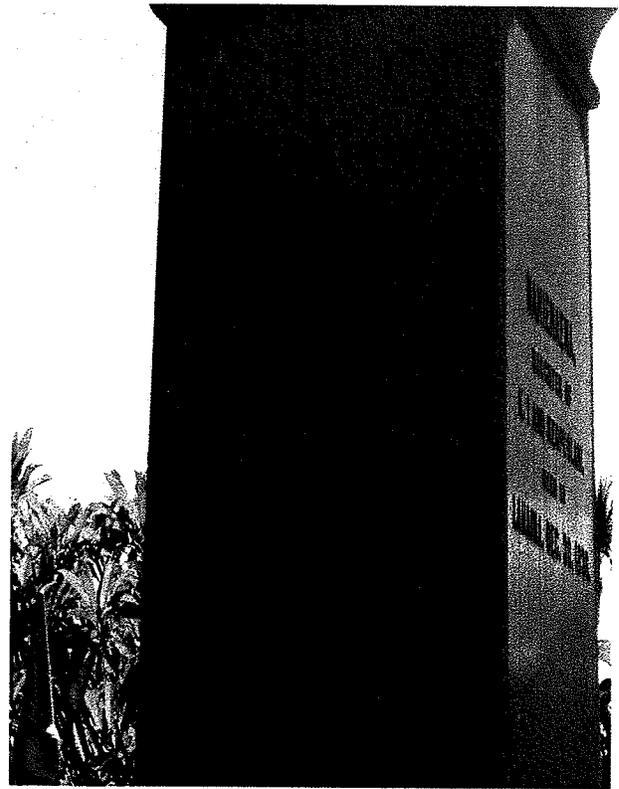
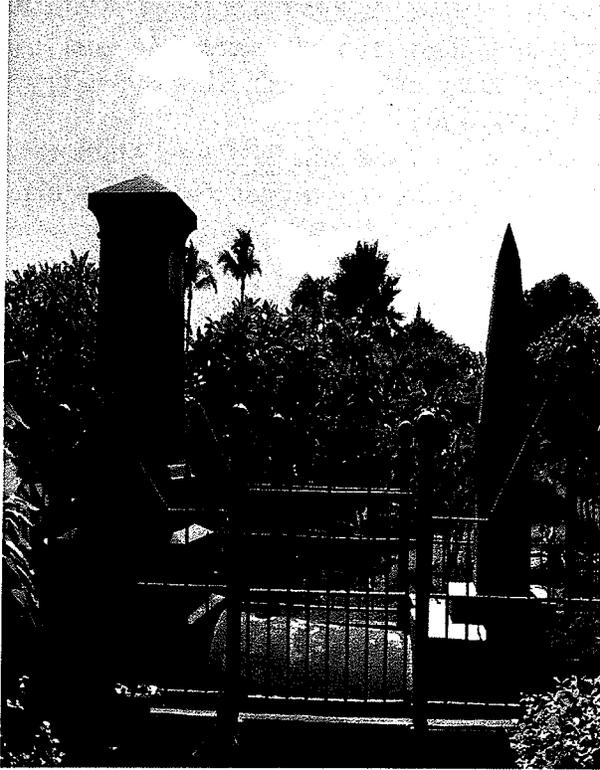
First High School

West of Rocky Mountains and Printing Press



TOMBSTONES OF NA ALI'I

QUEEN KEOPUOLANI - CHIEF KAUMUALI'I
PRINCESS NAHI'ENA'ENA



all the way up to the baseball park now the area which included a fishpond is covered up and is used for parking, stores and the present Malu'ulu-'o-Lele ball park (Kaniho).

Maui Chief Pi'ilani

A powerful chief who assisted in the physical architecture and cultural outlay of the island of Maui in the 1500's was Pi'ilani. He took up residence on the strip of land on the beach side of Moku'ula. The chief's ruling power extended from Hana in East Maui to the six bays of West Maui collectively called Honoapi'ilani or the bays acquired by Pi'ilani. The bays were Hononana (animated bay), Honokeana (the cave bay), Honokowai (bay drawing water), Honokohau (bay drawing dew), Honolua (two harbors) and Honokahua (sites bay).

Another great contribution Pi'ilani made unique only to Maui was the famed Alaloa or long road. This road, which the king started, was the only ancient highway to encircle any Hawaiian island which he completed at West Maui. His son Kiha'api'ilani followed through by completing the East Maui area. The road was four to six feet wide, 138 miles long, and a rock-paved thoroughfare prominently called the King's Highway. Historical accounts refer to the Alaloa running through Kahoma and the Ka'anapali Resort but it was destroyed by bulldozers when the plantations prepared the grounds for pineapple and sugar cane (Kamakau, 1961).

Lahaina, A Port Of Aloha

Upon investigating the living conditions of Kamehameha the Great's one year occupancy around 1802 which would establish Lahaina as the capital of the Hawaiian Islands, we were impressed by the fact that the West Maui Hawaiian community could supply their guests with the needed food for about 2,500 Lahaina residents. The Lahaina village during the time of King Kamehameha stretched from Mokuhinia Pond to the neighborhood known today as Mala. Mala Wharf and the Royal Coconut Grove were planted and maintained by orders of Queen Ka'ahumanu. At one point, it was estimated that Kamehameha had attacked Maui with 10,000 canoes. Multiply that figure by 4 to 6 warriors per canoe and that would give us an estimate of the large number of warriors the residents had to serve.

Kamehameha and Sandalwood

The Lahaina District had already been fulfilling the demand for supplies during Kamehameha the Great's sandalwood trade. During those early years, it was expected of the Maui natives to cut the sandalwood from distant Haleakala, drag it down to Central Maui, and deliver the fragrant sandalwood logs ('iliahi) to those ships in Lahaina that would deliver the King's cargo to China to be made into several items such as perfume, furniture, oils, etc. It certainly removed the Maui islanders out of their laid back lifestyle. The burden to supply large groups of uninvited guests did not stop with Kamehameha.

Whaling Ships

By 1822, there were recorded 34 American whaling ships replenishing supplies in the Hawaiian Islands, mainly in Lahaina. In 37 years, the number of whaling ships increased to a whopping 549 ships that docked for the winter months in Lahaina. The ship's captains expected to procure provisions and construct much needed repair work on their ships. The townspeople, including the influx of Christian missionaries who had taken up residence earlier, were not ready to handle the pleasure-bent, unruly and hard to handle crew.

With further study, we came to the realization that the entire Lahaina District was filled with an abundance of land crops such as taro and banana mauka and makai due to the abundance of water. The town of Lahaina was expected to assist in fulfilling the needs of the sailors. Exposure to the outside world brought rapid growth to Lahaina as well as rapid challenges. Every ahupua'a from Ukumehame to little Kahoma and out to North Honokohau and Kahakuloa was expected to provide the needed supplies.

'Alamihi, Kahoma's Loko I'a

The rich shorelines of Lahaina assisted the community with supplies from the sea such as fish, squid, octopus, seaweed, etc. Maui had been at the forefront in developing ocean aquaculture (loko i'a) that first started in Maui as early as the 13th century. The developments of the loko i'a at various locations in the Hawaiian Islands were created for the specific purpose of sheltering and nurturing fish for consumption.

The building of the first fishpond starts with a famous ancient story of the fish deity named Ku'ula who lived at Lehoula in the district called Aleamai, Hana, Maui with his wife Hinapuku'ia. The first work he was inspired to fulfill was to construct a loko i'a handy to his house but close to the shore where the surf breaks. This pond he stocked with all kinds of fish. Upon a rocky platform he also built a house to be sacred for the fishing kapu which he called by his own name Ku'ula.

Although Moloka'i has revived the cultivation their fishponds, the mokupuni (island) of Maui lists many fish pond sites that were built in ancient times but many are now dormant or covered by man today.

In our cultural search of Kahoma, we found that some investigators of the past had been aware of the presence of a possible fishpond named 'Alamihi which extended south from the south bank of Kahoma Stream. The Territory of Hawai'i granted a permit to Sizuko Suehiro to use the pond in the early 1900's. It is not known whether it was really utilized for aquaculture purposes by Suehiro. Surveys taken from 1908 concerning its size at 5.230 acres showed a significant decrease in size to 2.417 acres in 1953. In the later 1920's, 13,400 cubic yards of fill material was added to the pond as part of a public works improvement project to the Mala Wharf area. Though it was unclear where the material was put, it was thought to have been placed along the existing access road to Mala Wharf which would cut right in the middle of the fishpond.

All indications point that the 'Alamihi pond was intentionally filled in very rapidly by man. These factors, combined with a probable drop in the water table during this century, rapidly decreased the utility of the pond for aquaculture (Kanalei Shun Report).

Moku'ula and Mokuhinia

South of Kahoma, at today's 505 Front Street, was the more popular fishpond of Mokuhinia which housed Moku'ula, an ancient royal palace and religious site. This pond was fed by the freshwaters of Kaua'ula Stream. There were other fishponds in the neighborhood but Mokuhinia received most of the attention because it was the original home of the lizard goddess Kihawahine. Hawaiians believe that the essence of this sacred goddess has been present in fishponds throughout the State of Hawai'i. Kamehameha I called upon her powers when he was on his quest to conquer all the islands.

Later in the 1830s and 1840s, Kamehameha III used Moku'ula as his private residence. The Hawaiian government was run from the secluded island until 1845 when the capital was moved to Honolulu. While residing on the secluded island of Moku'ula, King Kamehameha III passed the land law called the Great Mahele. This law allowed land to be purchased by foreigners

On the opposite side of Kihawahine's home North of Kahoma was Pu'u Keka'a, the residence of King Kaka'alaneo. Pu'u Keka'a is known as the leina a ka 'uhane (the place of the passing of spirits). Hawaiians believed the souls after passing went to a sacred place to leap off into the next world.

In Fornander, Vol. 5:542, he writes:

On account of the great number of people at this place there are numerous skeletons as if thousands of people died there; it is there that the Lahainaluna students go to get skeletons for them when they are studying anatomy. The bones are plentiful there; they completely cover the sand.

This is a ghostly place. Some time a number of people came from Ka'anapali (from the other side) going to Lahaina in the dark. When they came to Keka'a stones rolled down from the top of the hill without any cause. It prompted the neighbors to run around shouting, Keka'a is ghostly! Keka'a is ghostly!

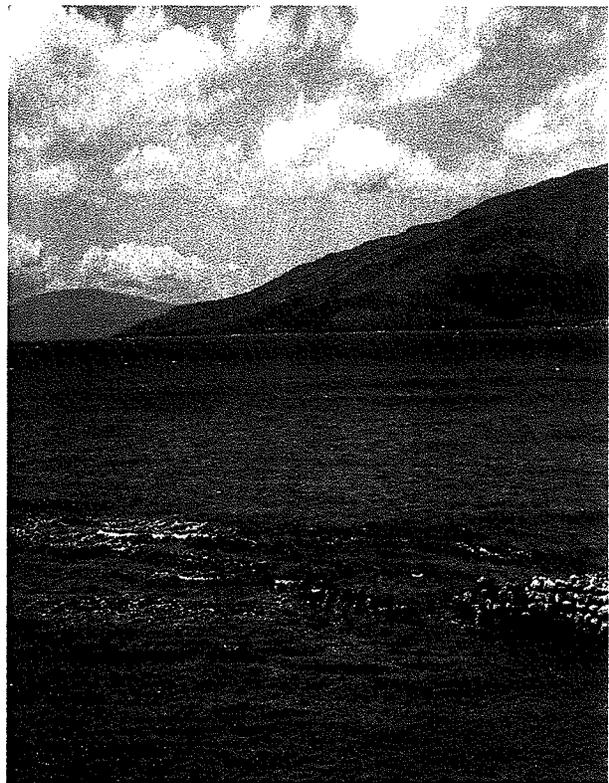
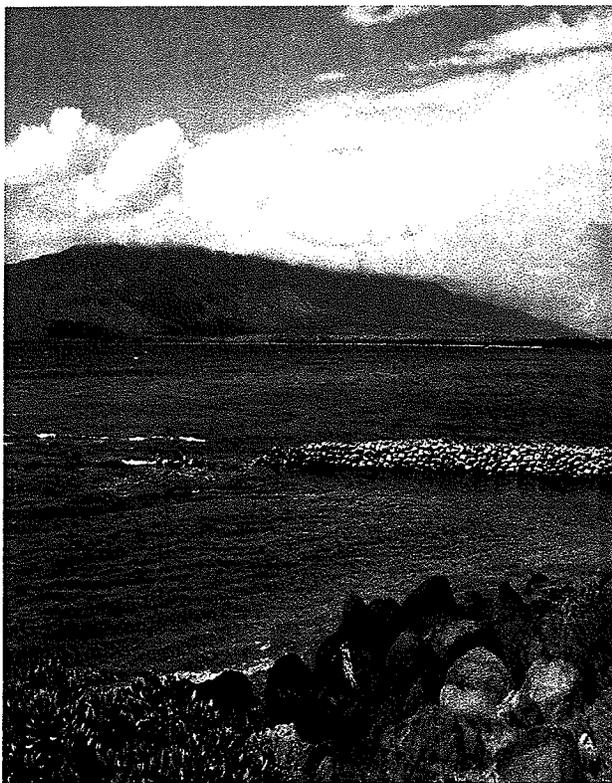
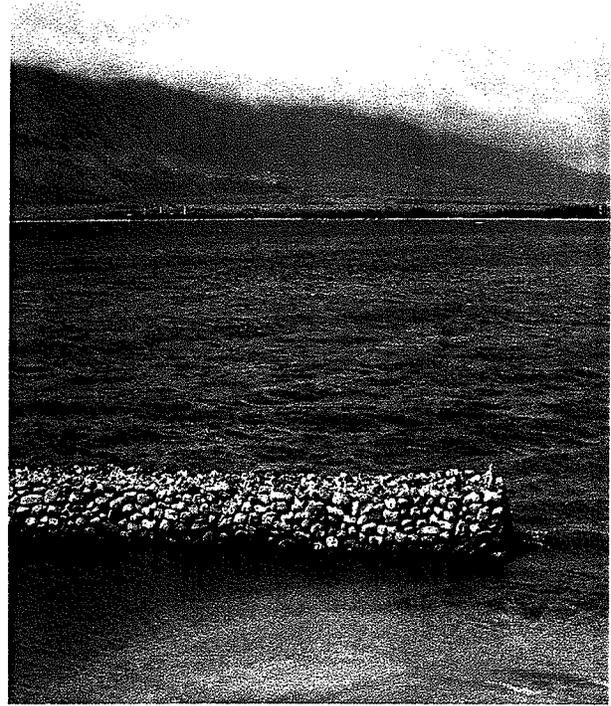
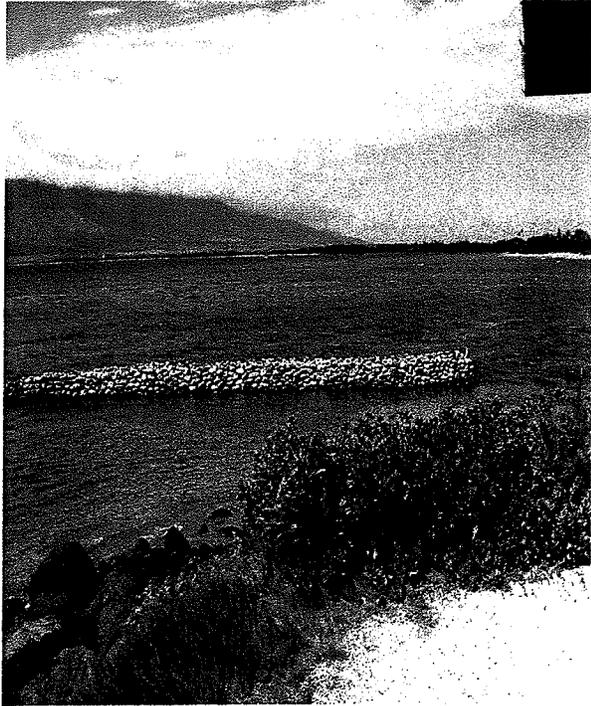
One of the reasons for finding so many corpses at Pu'u Keka'a was that a historical battle called Koko'o'na'moku took place there.

There are existing gravesites at Pu'upihia at the mouth of Mala Wharf. The neighboring Japanese Jodo Temple reported that many of the graves there are Japanese, Chinese and Hawaiian. The sandy coastline all along the Lahaina ahupua'a was the burial site of many local families. Many students reported to the KSFP that the banks of Kahoma Stream also served as gravesites to past residents in the area (Shun Report).

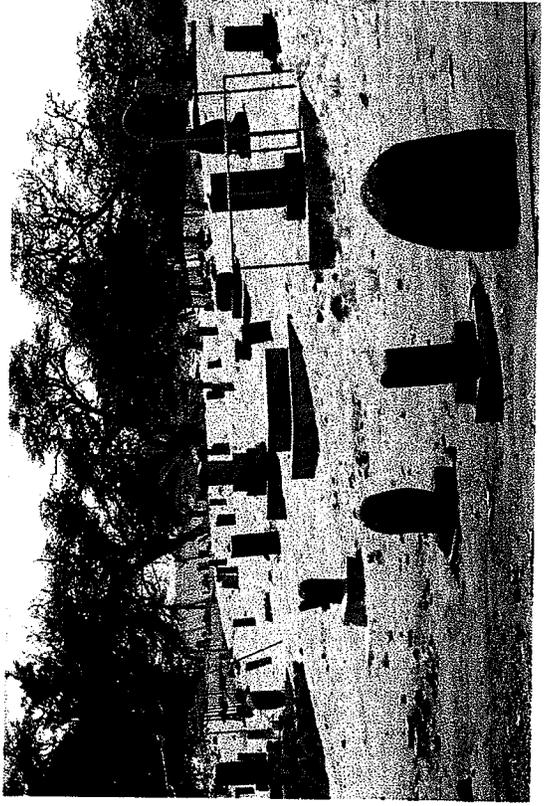
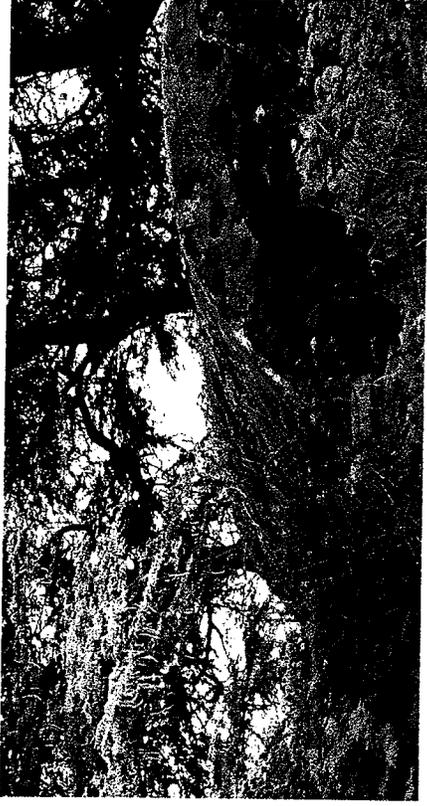
Lahaina's Ancient Temples

Kahoma sported its own heiau (ancient temple) called Luakona Heiau located at the rear of the old Chinese Store at Moali'i Bridge over the Kapa'ulu Stream between the wharf and the cannery (Ashdown). Ashdown goes on to list several other heiau starting with Wailehau at Malika Beach, Halekumukalani in the Puehuhunui cane fields above Lahaina and Apa'ahua heiau in the cane fields above Pioneer Mill Company's power house. She lists others such as: Wai'ie, Halulukoakoa and Moku'ula. It is appropriate to recognize that a thriving community required having their own temples so that the residents could conveniently go to worship their gods on their own accord. In "Sites of Maui", Sterling writes that a chief of Maui named Oho'ohukulani, was

LOKO I'A - Fish pond CONSTRUCTION IN PROGRESS



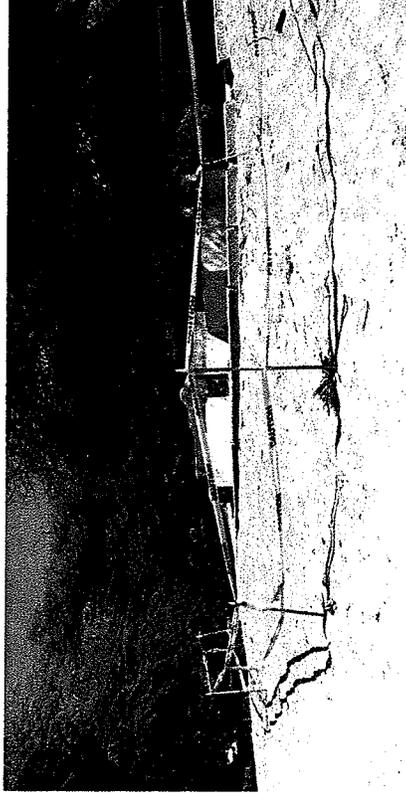
MALA WHARF BURIALS



Recent Erosion of Ocean Grave

at Mala Wharf

- Lahaina Jodo Mission provided valuable data on the oceanside graveyards @ Mala were filled with early Chinese & Japanese corpses. Since it's location is on the sandy seashore, many of the graves were recently uprooted by high surf in the area as indicated in the picture.



taken to the Pu'uhale heiau in Lahaina and offered as a sacrifice after he was killed by Kaka'alaneo's son Kaulula'au. This type of sacrificial heiau is called Luakini.

Ki'i Pohaku

Histories of the past were documented on the rocks and the walls of the river beds throughout Hawai'i. Many petroglyphs are still being discovered as archeologists and cultural assessors walk the land with a fine tooth comb. In Connolly III's Phase I KSFCP, he sites a location of Kahoma petroglyphs with an accompanying map of its location right in the middle of Pioneer Mill Company property.

Less known and apparently of far older origin are petroglyphs of strictly matchstick type located on the side of a cliff up Kahoma Valley, just below Lahainaluna School. Also located on Pioneer Mill Co. property, they were recently discovered by J.B. McConkey, of Lahaina Light & Power Co. Ltd. Along the left side of the road, the figures are found at intervals for at least a sixth of a mile. Since the area has been relatively unexplored, it is believed that more of the figures may exist behind the dense underbrush at the base of the cliff. Others probably exist on the buried faces of slate which have fallen from the parent cliff (Sterling, 42).

Pioneer Mill

High above the Lahaina town backdrop of Kahoma Stream is the landmark smokestack that represents an era that changed the lifestyle of the residents of Lahaina. Started in 1860 by James Campbell, Henry Turton and James Dunbar, they ran the newly created Pioneer Mill Company that expanded into sugar production which was delivered by train to Pu'u Keka'a in Ka'anapali at Black Rock. In 1957, they proposed a multi-million dollar resort which started replacing sugar plantations with golf courses, hotels, condominiums, shopping malls, restaurants and shops.

Except for the smokestack and the train that still runs vacationers on a scenic ride, Pioneer Mill is closed for business.

Hauola Rock

One of the most sacred and significant sites that have come down through infinity is the Hauola Rock that sits close to shore in Lahaina Town. The rock relates to a woman by the name of Hauola who fled from her enemies. When she reached the shore, her gods turned her into the Hauola Rock. Hau means to worship and ola means life (Ashdown).

Report Summary

Anchored upon the definition of Hauola, here is our response to the development of the Kahoma Subdivision. The Kahoma project will assist in providing much needed affordable housing in the surrounding area in the spirit of Hauola or the appreciation of life. The designated developing area TMK {2} 4-5-10: Parcels 5 &6 are far back from the ocean so that it won't affect the shoreline. The development would not influence the Kahoma Stream run off after development because it is high and far removed from the fence line and serves as a barrier for irregular pollution activities. No cultural sites and artifacts were found on the actual piece of land by the cultural assessors. Even though there were many significant sites in ancient times, there is nothing left that might have impact on Hawaii's culture. We are including a list of native trees and plants that can help the weather patterns and overall environment of Kahoma and retain the Hawaiianess of the ahupua'a. The suggested plan to have an entry/exit road that leads to Lahainaluna Road and another entry/exit road towards Honoapi'ilani will help the flow of the neighborhood traffic. In short, we leave this report me ke aloha pumehana (with our sincerest aloha) and the wisdom of our kupuna who said, "E ho'olohe i ka leo o ka 'aina" (Listen to the voice of the land).

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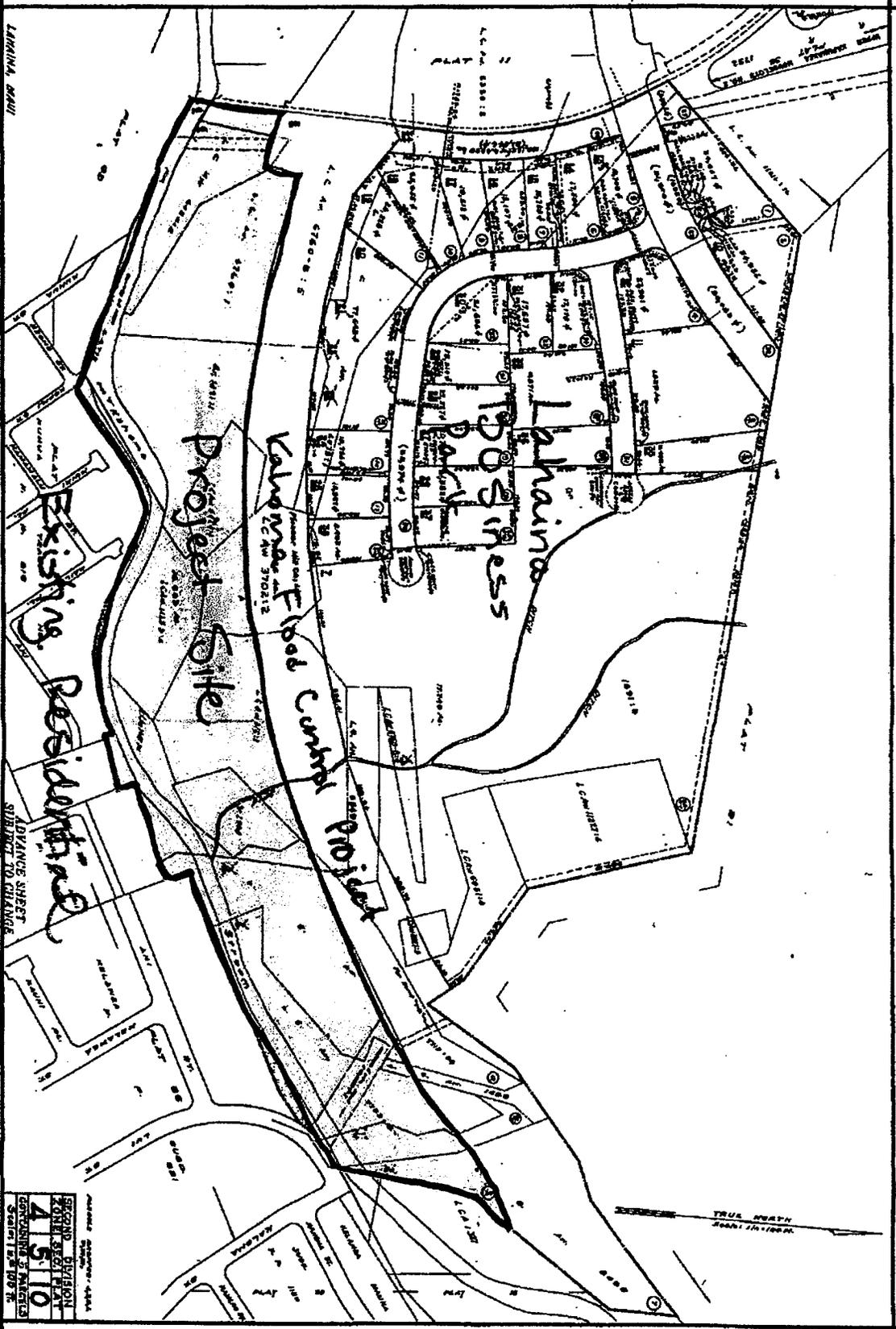
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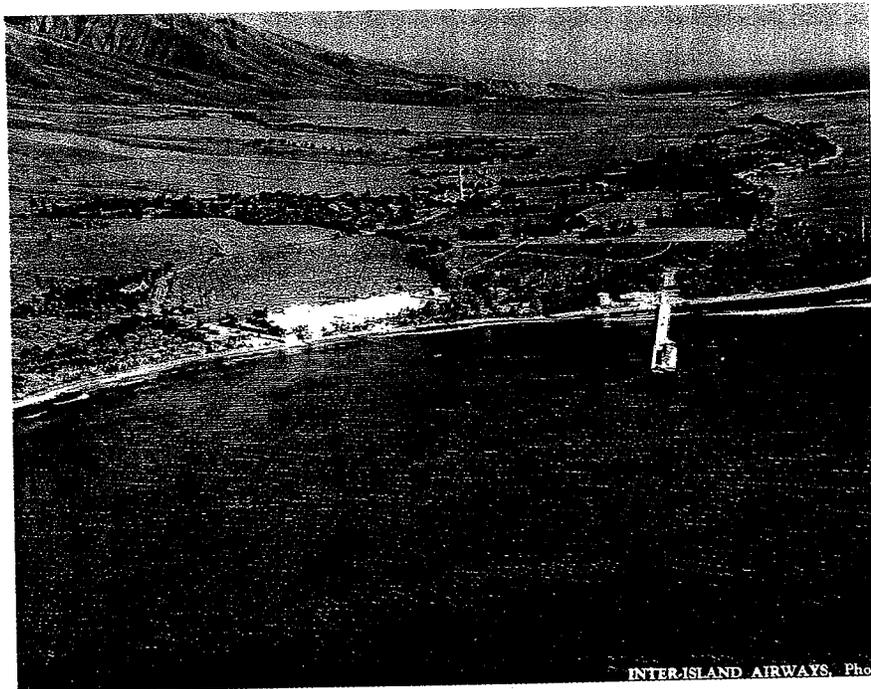


Address: 4510
 City: Kalamazoo
 State: MI 49001
 Parcel No.: 4510
 ZONING DISTRICT
 4510
 CONVYING & PARTS
 Scale 1" = 40' N

LOCATION MAP



KAHOMA
EMPLOYEE
SPECIAL NEEDS
MARKET SITE





COCONUTS,

LAHAINA, HAWAII.



Coconut Grove - Maui, H.I.

Some Kahoma Native Plants

Type*	Scientific Name	Hawaiian Name	Family
S	<i>Achyranthes splendens</i>	Ewa hinahina	Amaranthaceae
T	<i>Charpentiera ovata</i>	Papala	Amaranthaceae
S	<i>Nototrichium sandwicense</i>	Kulu'i	Amaranthaceae
T	<i>Rhus sandwicensis</i>	Neneleau	Anacardiaceae
L	<i>Alyxia oliviformis</i>	Maile	Apocynaceae
T	<i>Rauvolfia sandwicensis</i>	Hao	Apocynaceae
T	<i>Reynoldsia sandwicensis</i>	Ohe makai	Araliaceae
T	<i>Tetraplasandra hawaiiensis</i>	Ohe mauka	Araliaceae
T	<i>Pritchardia forbesiana</i>	Loulu	Arecaceae
S	<i>Bidens mauiensis</i>	Ko'oloa'ula	Asteraceae
S	<i>Artemisia mauiensis</i>	Ahinahina	Asteraceae
S	<i>Lipochaeta succulenta</i>	Nehe	Asteraceae
T	<i>Cordia subcordata</i>	Kou	Boraginaceae
S	<i>Capparis sandwichiana</i>	Maiapilo	Capparaceae
S	<i>Chenopodium oahuense</i>	Aweoweo	Chenopodiaceae
L	<i>Ipomoea indica</i>	>>Ipomoea indica	Convolvulaceae
G	<i>Jacquemontia ovalifolia</i>	Pa'uohi'iaka	Convolvulaceae
L	<i>Bonamia menziesii</i>	Hawai'i lady's nightcap	Convolvulaceae
L	<i>Sicyos hispidus</i>	Anunu	Cucurbitaceae
GS	<i>Carex wahuensis</i>	Oahu sedge	Cyperaceae
F	<i>Nephrolepis cordifolia</i>	Kupukupu	Dryopteridaceae
T	<i>Diospyros sandwicensis</i>	Lama	Ebenaceae
S	<i>Styphelia tameiameia</i>	Pukiawe	Epacridaceae
T	<i>Acacia koaia</i>	Koaia	Fabaceae
L	<i>Canavalia haleakalaensis</i>	Awikiwiki	Fabaceae
S	<i>Senna gaudichaudii</i>	Kolomona	Fabaceae
S	<i>Scaevola gaudichaudii</i>	ridgetop naupaka	Goodeniaceae
G	<i>Dianella sandwicensis</i>	Uki'uki	Liliaceae
T	<i>Pleomele auwahiensis</i>	Hala pepe	Liliaceae
T	<i>Hibiscus kokio</i>	Koki'o 'ula	Malvaceae
T	<i>Hibiscus brackenridgei</i>	Ma'o hau hele	Malvaceae
S	<i>Sida fallax</i>	Ilima	Malvaceae
S	<i>Abutilon menziesii</i>	Ko'oloa 'ula	Malvaceae
L	<i>Cocculus trilobus</i>	Huehue	Menispermaceae
T	<i>Myoporum sandwicense</i>	Naio	Myoporaceae
T	<i>Metrosideros polymorpha</i>	Ohi'a lehua	Myrtaceae
T	<i>Pisonia sandwicensis</i>	Papala kepau	Nyctaginaceae
G	<i>Peperomia leptostachya</i>	Ala'ala wai nui	Piperaceae
T	<i>Pittosporum glabrum</i>	Hoawa	Pittosporaceae
GS	<i>Eragrostis variabilis</i>	Kawelu	Poaceae
GS	<i>Heteropogon contortus</i>	Pili	Poaceae
T	<i>Alphitonia ponderosa</i>	Kawila	Rhamnaceae
T	<i>Santalum ellipticum</i>	Iliahi	Santalaceae
T	<i>Dodonaea viscosa</i>	A'ali'I	Sapindaceae
T	<i>Pouteria sandwicensis</i>	Ala'a	Sapotaceae

Type*: T = Tree, S = Shrub, G = Groundcover, L = Liana, F = Fern, GS = Grass Sedge

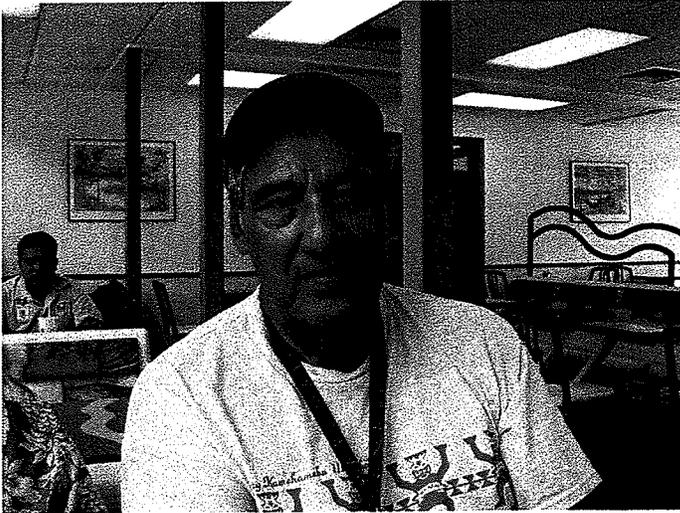
Some Kahoma Native Plants

L	<i>Smilax melastomifolia</i>	Hawai'i greenbrier	Smilacaceae
T	<i>Nothocestrum latifolium</i>	Aiea	Solanaceae
T	<i>Wikstroemia oahuensis</i>	Akia	Thymelaeaceae
S	<i>Pipturus albidus</i>	Mamaki	Urticaceae

Type*: T = Tree, S = Shrub, G = Groundcover, L = Liana, F = Fern, GS = Grass Sedge

INTERVIEW: Harold Kaniho

By Keli'i Tau'a and Kimokeo Kapahulehua
Oct 17, 2005



Interviewers = KT/KK and Consultant = C

KT – Harold, please give us your full name?

C – Harold Kale Kaniho & I am 72. Born in Lahaina on July 24, 1933 & attended the old Kamehameha III when it was 2 story building from kindergarten to 8th grade. In those days, they had schools @ Honokawai, Pukoli'i??, then after they merged the schools then they came to Lahaina Front Street. Some had only K to 5th. After, students went Lahainaluna.

KT – Borders @ Lahainaluna have a lot of personal experiences in Kahoma.

C – I've been in there. There's lots of foliage, kukui trees, etc

KT – Did you see taro patches?

C – Yea. That I saw. I think those belonged to the Keahi family from Mala. Now one of the relatives live up there by that place. The Neizman girl married to that guy named Hans. He raises goats over there. Up there was a camp called Crater Camp. There was a little Crater up there and that's why they called it Crater Camp. We use to p/u the kids to come to school and to play sports.

KT – You folks played against the camps?

C – Yeah. Some team names were Launiupoko, Lahaina Pump, etc.

KT – You worked for Pioneer Mill. Can you remember when (it) Kahoma overflowed?

C – I know when it did it flooded out Mala Camp. The water jumped the river bank. Up there had good kind awa.

KK – What was your job @ Pioneer Mill?

C – Everything. I worked for the co. over 45 yrs. I know that Kamehameha III school had developed a very good band and challenged all the high schools. The teacher's name was Sam Mo'okini. The students could play every instrument in the band. Everytime we had May Day, Emma Sharpe and Eddie Kamae's grandmother (Eddie Kamae) from this area use to participate. Eddie Kamae had patents of land up in Kaua'ula as told by Ke'eaumoku who is working and living up there now. My father didn't want anything to do with land cause he knew the challenges it would bring to the family.

KK – What was your father & mother's name?

C – Humihumi Kaniho father and mother Mary who was pure Portuguese. Grandfather was Joseph Kalakaua Andrade. He was a luna for Pioneer Mill. I remember all the Tutus meet under the banyan tree during Mayday with their holoku, mu'umu'u, hats, leis. The old style Valley called or referred to as Halona. My family was up @ Kauaula. John Paul and Mahelonas. When I was young, I use to go up Kauaula, had taro patches and lots of fruit trees. In the patches had gold fish, o'opu, etc. I didn't finish here @ Lahainaluna School, I went to work for the plantation early. The water was not flowing all the way to 'Olowalu. One man water had to take its course.

KK – What about the seashore?

C – Our family was very sad and in tears when they built the breakwater and harbor, We were not able to beach the canoes right on the beach in front of Front St. It was a sad day in Lahaina. People were very upset right in front of Pioneer Hotel. When we were small kids, we learned to swim over there. It was sloped in first steps, second steps, third steps. I know the Nai'a and the Mana used to come in @ Mala Wharf. We used to go dive way outside of Mala and catch any kind of fish. Planty of taco all the over to Puamana and Launiupoko Stream. My wife comes from Kahana Stream. Lot's of pepeiao. I do lots of crafts @ home and lot's of collections of old artifacts like bottles, (Lemon soda, bottle), Tahauri, (Cream soda), We had a lot of JPO's for school. We lived right behind the park.

INTERVIEW: Ewalani Shim

By Keli'i Tau'a and Kimokeo Kapahulehua
Nov 17, 2005



Interviewers= KT /KK and Consultant=C

KK – What is your name?

C – My name is Gwendolyn Ewalani Lum Shim

KK – When were you born?

C – 1941 @ Honolua Bay, Maui. My Tutus had a home there in the year 1848 and the tidal wave took it in 1946. On April Fool's Day I was born @ my Tutu's home and my mother had a mid-wife, her name was Akeneki Kane. My older brother and I were both delivered in the same way under Haili Keahi. Next to Honolua is Punalau where after the tidal wave my Tutu went to reside @ Punalau on top of the hill in 1946. Past Punalau is Honokahau Bay and valley.

KT – What was Honolua Bay like before the tidal wave?

C – It was called Slaughter House called Honokahua. There was a ranch there run by Maui Land & Pine which was Baldwin Packers. Henry Baldwin was the big man @ that time raising cattle and pineapple. My great-grandfather Haili Keahi was a supervisor for Baldwin Packers and the other Hawaiian families, the Kukahikos, they all worked for Baldwin Packers. I'm a graduate of Kamehameha III School. My mom & dad moved to Honolulu so I was raised by my grandparents until I moved w/ mom & dad to Honolulu.

My Tutu lived in Honolua Bay the year 1848 with the home my great great grandfather Haili Keahi had a shed on the side of the house to pound their own poi. Honolua Bay was where my grandfather Joseph Haili (fisherman) gathered their food. Honolua Bay was famous for Akule fishing. Honolua Bay area was a cattle ranch run by Inez Ashdown's husband. It was

under Henry Baldwin, Baldwin Packer's Pineapple Co. My great great grandfather Haili Keahi was a supervisor for the pineapple company under David Fleming Senior. Mr. Fleming Senior had his akule boat launched by the ramp. When it was akule season, great great grandfather and all the family and workers from the pineapple company went out with the boat. My mom said that there was always a big gathering there with all the families enjoying a big pa'ina (food feast like a luau).

Mom & dad moved back to Maui & lived in Lahaina at Baby beach so we walked to Kamehameha III School. I lived down by Mala Wharf. Went to Lahainaluna for four years. There were 10 children and I am the 2nd oldest child.

KT – Where is the oldest?

C – He passed away. He lived in Waimanalo married to a prominent Sanborn family. (Granddaughter)

KT – When you moved back to Maui, did you get to play @ Kahoma Stream?

C – When we moved back, we lived @ Ah mau Camp where the Hinau family was our neighbor..

KT – Betty Hinau?

C – Yes, her husband. We lived close to Ah mau Camp and the Leong family lived close by right by the stream. My father use to pick mangoes by the stream to make mango seed & pickled mangoes.

KT/KK – The joining of Kahoma and Kahana caused big water flow. What about the fish?

C – My Tutu said all the fishing was @ Honolua & Punalau and Honokahau Bay.

KT – Do you recall walking up Kahoma?

C – No but I had uncles who attended Lahainaluna High school. The school had lots of spirits. The school library burnt down in 1959 and lost much and most of the valuable history and very old documents. I worked in the library. Some of my classmates, Julian Kaleopu and Kenneth Kenui (Alexa Vaught's brother) who live in Lahaina. Norbert Hinau who lives in Honolulu would know more about Kahoma Stream. The border at Lahainaluna school would know more about the Kahoma Stream.

C – In Lahaina, they need more roads and low income housing. My classmates climbed up to the L (the high school symbol above the school) to help clean and paint and see David Malo's grave. Lahaina hardly rains but the plantation took a lot of the water. All the borders at Lahainaluna were familiar with the streams. The Meyer boys from Moloka'i, Pinhos and William Mederios from Hana, Aunty Barbara Kukahiko was our cafeteria manager. One of the uncles got very sick which was believed to have been of a spiritual nature.

KT – You are presenting something that in the western mind is unbelievable but our kupuna understood it. Very important for us to document for our youth to understand. What are some significant events?

C – I remember May Day under the Banyan Tree. We use to do the Maypole dance that I thought was very special but we don't see it anymore. Aunty Emma Sharpe, auntie Sanborn, all of us. We sang a lot, it was very special for me. Nobody talked to us about Hawaiiana

when I went to school. In fact, we didn't even learn the language. My mom and Tutus spoke Hawaiian fluently but they asked us to speak English, no pidgin and simple Hawaiian.

My grandparents were taro farmers in Honokahau valley, laid nets @ Punalau, we all had to go help take all of the fishes out from the nets and put it in big pakinis, Then grandpa and the boys use to go to Honokahau valeey to pull taro. I had three cousins that lived with grandparents, one cousin cooked the taro, after, we went over to peel and clean and get it ready for grandma to put it in the hamburger grinder. During my great great grandfather's time, they pounded the poi. At great grandpa Haili Keahi's house he had a board in there so w/ poi pounders, I sat there and watched great grandfather pound poi. I have his poi pounder which I gave to my son.

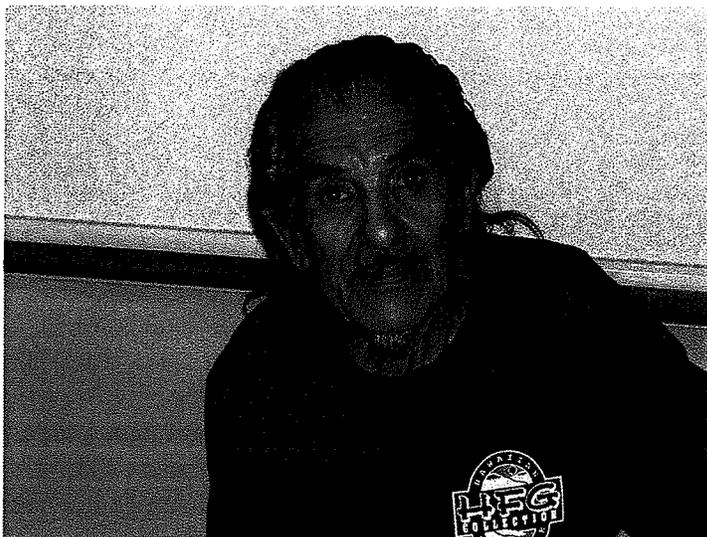
KT – You are 64, who is next to you?

C – My brother is 65. My sister is 63 who lives in Lahaina. We all went Kamehameha III and graduated from Lahainaluna. I am a graduate of Honolulu Business College, worked for Honolulu Star-Bulletin then went to the mainland Berkerly to live. I worked 30 years at Savings & Loans. My sister, Beverly, & I both worked in the mainland for lots of years. I was raised in Honokahau and my grandparents had a Model – A truck. They had a home in the valley which was very nice. They had the old fashion cranking phonograph.

They always had problems w/the water Grandpa, Uncle Phillip, and uncle Loui Chun always fought over the water. The dam that they built controlled all the water in the year 1900 by Baldwin Packers now Maui Land and Pine. My grandfather Joseph Haili had taro patches in Honokohua Valley. Poi was put on the table breakfast, lunch and dinner. Fish was put on the table every weekend by my grandma and grandpa Joseph Haili. They shared their fish and poi to lots of Hawaiian families like the Jessie Nako'oka family, uncle Charlie Aukela family, Peter's, Lindsey, Sato, Kauhane families, all neighbors. The Haili Tutus were very well known in Lahaina. My grandfather Joseph Haili worked for the County of Maui for 35 years. He was also ??? Vetrans for World War I. Buried at Makawao memorial Vetrans' ??? Park.

My grandfather Joseph Kaili Keahi was 100% Hawaiian. A very humble man, soft spoken always smiling had lots of love for his Hawaiian people, always sharing his poi and fish, never a harsh word to his workers and his own family. I consider them # 1 Grandma and Grandpa in my life—him and my grandma Mary. Very very hard workers; they raised a total of 18 children in the Honolua house.

INTERVIEW: Joseph Lai
by Keli'i Tau'a and Kimokeo Kapahulehua
Oct 12, 2005



Interviewers= KT & KK and Consultant=C

KT – What is your name Joe?

C- Joseph Lai

KT – You got a Hawaiian name?

C – No Hawaiian name. Only Chinese name.

KT – What is it?

C – Yee Leong Lai. That's my middle name now.

KK – What does Yee Leong mean?

C – I don't know

KK – Maybe Lichee or something.

KT – When were you born?

KK – 1932///// 1/16/32

KT – Where were you born?

C – I think I was born in Haiku.

KT – Haiku, Maui yeah because there are other Haikus on other islands?

C – I was adopted by the Lai family. The family live up Kula I think the original family.

KT – Now where you live? What's your address?

C – 970 Malanai St. My father-in-law's phone number :Ph. No. 661 – 9282///// Cell –269 – 0552

KT – When did you move to Lahaina. How old were you when you moved to Lahaina?

C – I was 2 and a half yrs. Old.

KT – What can you remember about Lahaina?

KK – All the Pakes were selling crack seeds, manapua, moyashi & boil peanuts(penachi)

Joseph laughs

KK – When I came here in 1963, Front Store by Planet Hollywood, Japanese store before, boil peanuts they had all the jaws(containers outside) filled w/crackseed.

C – That was by Hopwo Store every Sunday selling Okolie, Omako, liberty soled chow lun or call it dry soup. Every Saturday sold manapua and pie were sold

KK – You folks(parents) had a store right here, by the cannery, what was the store name?

C – Lai Tong Store

KT – You worked PT for Pioneer Mill? Herbert Eberly was my boss.

C – Yeah, in 1955. Baldwin Packers.. (Intermediate = Part Time)

KT – What was your job? What did you do?

C – Empty cans, Cannery, stacker, warehousing.

KT - Pineapple

KK – How much you get paid?

C – Dollar quarter an hour. No benefits until I joined the union, ILWU. In 1957, I worked there for 7 yrs. And then Maui Pine for 1 year and a half. That's when Baldwin Packers and Maui Pine merged .

KT – Where did you go to school?

C – Lahainaluna and graduated 1955. Then I worked @ Sheraton Maui 31 & half years as a cook.

KT – With Earl Kukahiko yeah when he was a boarder.

C – I think so.

KK – Only boys boarding school at that time.

C – Only boys but I was a day student.

KT – Did you know Thomas Cummings?

C – Yeah

KT – Thomas told me but you day student so you might not know. He told me they use to let the cattle go down to the river, Kahoma River, they go down to get them to milk the cows.

KT – Have you been down to Kahoma River?

C – I've been down but not with the cattle. I know they had cattle, pig, chicken, vegetables(corn, string beans) and what not down there.

KT – Why did you go down Kahoma River?

C – To play and p/u pepeiao, koa, and milkweed for rabbits, plus swim in the river.

KK – What about the V & 'O'opu? Fresh water 'opih.

C – When I went up, I saw the shrimp and the 'opae and 'o'opu. Over here use to get plenty. Come all the way down.

KT – All the way down to where?

C – All the way down to the ocean where there were plenty of shrimp.

KK –The li'ili'i one yeah. What about the ocean, fish, the papio and mullet use to go up river. What about the ulua? Kumu, mullet & papio

C – Not that I know. Some fishes, mullet go up, red fish.

KT – How far did the fish go up river?

C – To the bridge and sometime higher depending on the tide by Safeway or side of Longs.

KK – What about the birds? Never had Hawaiian birds?

C – Minjiro, myna, doves, sparrow, cardinals and rice birds.

KK – What about Hawaiian birds? Hawn duck, Hawn Stilt?

KK – What about the plants, had Koa trees?

C – Yea, had koa trees, kiawe, monkey pod, tamarine, plum and mango trees, date trees.

KK – What about lama, lauhala, etc.

KK – Had the same train tracks? By Mill road.

C – I think so, modified it. I KNOW FROM TRAIN TRACK DOWN. Ran to Mala Wharf to load sugar and bring in gas to the storage tanks at the mouth of Mala Stream.

KK – You know the gravesite by the ocean by Jodo Mission?

C – The Chinese close to the Wharf and the Japanese close to the Jodo Mission. Had Chinese also on Japanese side.

KK – You get any relatives over there?

C – No, my relatives by the county graveyard. I was adopted in the 1930's.. I Chinese/protuguese

KK – You know how to speak Chinese?

C – Very few words, simple words.

KT – Did you remember growing up seeing the taro patches?

C – Had some up @ Lahainaluna school by private owner

KK – Was it owned by the people or the school?

C – The community had their own garden

KK – You know their names, you know the type of or varieties like lehua, moi, ahakea

C – No I don't

KK – They had poi factory in Lahaina?

C – Yeah. Chung. They all bring the taro to the Chungs.

KK – You guys had poi factory in Honokahau?

C – No. Just the Chungs. The Chuns had one by where auntie Vicky was living.

KK – You went all the way up Kahoma Stream? They had a dam up there?

C – All cane fields. Had few homes, Japanese family. Had dam diverting the water to the Lahainaluna irrigation ditch all the way to Ukumehame ditch. (Honokahau to Lahaina)

KK – The one go lateral yeah?

C – Yeah! Above the cannery was all cane fields. Had few homes, Japanese families, Filipinos, Okinawans, Spanish & Portuguese).

KK – Can you remember when Kahoma had flash flood?

C – The year I don't know, around 30's, 40's, 50's. When the big water came breaking branches and debris all got stuck at the bridge causing the Flash flood to go into the cannery by Pioneer Mill.

KT – Where was the cannery located?

C – Same place as it is today. Before my father(hana'i) used to leave here in 1921 use to have flash floods with water going into the cannery. The land was low up to the Canoe restaurant. All the Mala camp, the land was low. Can see across the cannery now the land is low across the road.

KT – When you were living, where were the important properties that you can remember?

C – I think there was a heiau in front Jesus Coming Soon in the middle of Holao.

KK – What did the workers do after work in the camps. The companies provided housing.

C – They had camp parties in their plantation housing provided by Pioneer Mill w/\$100 subsidize

KK – Was the weather always like it is, dry & hot

C – Yea. Now more dry but now more trees. Mango trees, monkey pod and plum

KT – Who were some important people?

C – Clarence Agena who worked for Pioneer Mill. He worked @ Lahaina Store. He did community works. Japanese Festival "Bon Dance."

KT – What kind of events:

C – I can remember parades. Moon festival, Bon Dance.

KT – What kind of cars/roads. Model T's on partly paved roads

C – I used to drive a jeep on good roads till Honolua then it was dirt roads.

KT – Did you go fishing?

C—Some times I fished @ Mala Wharf catching Papio, Moi, Moana ula, with light reels using opae bait, opelu belly, bread,

KT — Are there any stories you want to pass on?

C— Spooky Kine? When at the Wharf, can hear ukulele and singing but when we go there, nobody there. Also, Dad used to hear voices calling him just like me.

KT — What changes would you like to see?

C— Stop building more hotels. When we only had Sheraton & Royal Lahaina, we use to have 100% most of the time but now it goes down 30 to 40%. Now more hotels and cost of living higher. Gotta lay off hotel employees because hotels not full. Too much traffic. Our environment, too many people. Too many commercial fishing, too many boats, too many cars.

INTERVIEW: Keola Sequeira

By Keli'i Tau'a and Kimokeo Kapahulehua
Oct 17, 2005



Interviewers= KT/KK and Consultant =C

KT – How old are you?

C-60

KK-Please give your full-name?

C- Levanne Keola o kalani Sequeira Born Feb. 7, 1945 in Honolulu and adopted by Seq where I lived all my life. Went Kamehameha Schools O'ahu, 1 yr. BYU –O'ahu then 3 half yrs. Air Force. Then returned to Lahaina, joined Police department till retired.

KT – We are specifically tarketng Kahoma but gathering info on neighboring ahupua'a. Can you start sharing about yours?

C – I live @ Pakala, it is adjacent to Mokuhinia on the Ka'anapali side of Honwanji Church. The Church area was the residence of King Kamehameha's governer Hoapili. This land here was for the Kaukau Chiefs (the chiefs that did not have the genealogical bloodlines to move them up the ranks of chiefs.) Hoapili gave this land to Catalina, his blacksmith to live right next to him. Eventually, Catalina sold out to my grandfather who was Russell Newton Sr. From him went to my grandmother Eldredge then to my mother and father Sequeira and then they gave it to me so now I am the kahu of this place. This Eldredge Newtons has been in the family since the 1860's. Dad says I'll give it to you but you can't sell it, only to the family because he wants the land in the family. I respect that and that's why I live here. I'm not the owner, I'm just the kahu.

Moku'ula is right across the street and grandma use to say, father use to go outside the porch and listen and he could here music coming from where the park is located, Mokuhinia and the music was nose flute type which made an impression on me. Although my grand

mother was Mormon, Christian, she had Hawaiian beliefs she really didn't go into it but now that I look back, I can see where she was coming from.

She learned la'au lapa'au from the Opunui family and she was pretty good at it. She had recipes that I don't see people using now. I use to gather the plants with her Her name was Lili Newton Eldredge. She use to gather popolo, ihe, uhaloa, other things on the ground but she impressed upon me that you can get the plants but without the prayers, it will not be any good. She had a combination of plants including sugar can in the medicines.

KT – So the prayers was important?

C – Yeah. She said without the prayers, it won't work.

KK – What about the limu?

C – I'm not to sure but we used to get our limu from Launiupoko. That was the primary place and Hanaka'o'o. We would get ogo, wawae'ole, lipoa. Now no more that fragrance, that iodine smell. They destroyed the park when they put the breakwater in. She didn't talk much about Kihawahine or the mo'o but Grandma warned not to kill the mo'o. Whatever you do, you don't kill the lizards. Of course, in the old days, they don't explain but now when I look back, I can see why. It was an understanding and respect for the spirit.

KK & KT – After showing Keola that maps where the Kahoma housing will be built, he responded

C – That use to be all camps, called Mill Camp. I remember, we used to play in the stream because used to be built up w/ rocks. When use to overflow, use to be flooded especially the cannery where Safeway today is located. Once the Kahoma Flood Control was developed, it eliminated the problem.

KK – You remember fishing in the stream?

Everything mauka of the cannery was all cane fields. Use to have old stone platforms.

C – No. As kids, we saw fishes in there but we never went after them. The old cannery used to be subdivided and used to overflow. In the 70's, we had to close the bridge in Front Street because of the flood and went into the old cannery. Used to have a camp w/ 10 to 12 houses up by Kahoma and an airstrip for the airplanes that use to spray the crops. Had cold running water, Crater Village. When you talking about Mill Camp, you talking about lot's of Japanese that lived up there. That's why they all went to Lahainaluna High School. If you talk to the old-timer Japanese, they going remember that area. Just start walking through that camp and you'll find a lot of people that know the area real good.

1950 – Father had a house mauka side of Dickenson. Plantation House that he rented. Mill Rd was adjacent to the house. Queen Lili'uokalani came and the Royal Hawaiian Band came play for her as she sat on the pune'e. Found pottery that came from the house where the Queen visited.

KT – Who were the outstanding people

C – Was plantation town so Puamana was Haole Camp for plantation hierarchy. When we were growing up, my father was like a supervisor in the plantation, a Portuguese on the dark side so although they were all on a friendly basis, the haoles considered him a step below even though he was in a supervisor position. He was a dark-skinned leader. That kind of thinking existed in the community but my father was one of the leaders in the community.

Another was Judge Freeland, owner of Pioneer Mill and prominent business. The rest was Japanese mom and pop stores, very few Chinese stores. Demello family was prominent, she was good at lomilomi, can take care of huli opu. (Old managers -Moyer family married into Farden family and Chesters who built a house on Front St.

KT – Major events? You building Mo'olele 74 – 75.

C – Reverend Kukahiko who lived @ was highly respected. He was the Hawn exorcist, he did it one time on me. Back in 61, my grandmother was still alive saw that I was not eating and looked pale. Grandma took me to see Rev. Kukahiko, she knew it wasn't physical. Grandma explained what she thought was happening so then he instructed me to place my fingers on the scripture that he opened. After that, he placed his hands on my head and blessed me. After the blessing, he explained that someone was jealous of you and that's why you weren't eating well and was possessed. When I walked out of the house and put my feet on the ground, I felt that something had been lifted. I had a lot of respect for that man. Everybody looked at him as a Christian minister but he know a lot of Hawaiian things. People like him and his son Earl Kukahiko who had a lot of influence up in Lahainaluna. Lot of people respected and looked up to him. Kahoma was alive w/common mango trees. Same type of birds we have today, no native. Kahoma wasn't flowing all the time.

KK – We came last week, flowing. Today, nothing.

C – Yep. Rain in the mountain, flow. My wife and I living here have found the significance of the place. Opposite side of Mokuhinia is Shaw who married one of the Ka'ai women. She was a lady in waiting for Queen Lili'uokalani. There property was on the Olowalu side of Kamehameha Iki Park. The parking lot underneath used to be a pond. When I was a kid, I saw fishes as it filled up there in the pond. Her house was on the makai side of the pond. Lot of people were afraid of her thinking she was a kahuna. Grandma said to respect her but not be afraid of her.

Today, I treat this place as clean as I can not allowing liquor anymore and if people are arguing, I ask them to step outside of the property. My wife pointed out that we are basically living on sacred property so keep it clean so we can have things come through. There are some who are letting alcohol and drugs influencing their lives. Presently, I feel we are like the kaukau ali'i. Do something as our elder. I do have the respect and love for this place, as father said, pass it on in the family. Some people no more roots, moving around. Our family get roots going back hundreds of years. At family reunions, I always remind the family of our roots.

INTERVIEW: Earl Ray Kukahiko

By Keli'i Tau'a and Kimokeo Kapahulehua

Oct 12, 2005



Interviewers= KT/KK and Consultant=C

C – Get two you know (He was referring to Kahoma St. and the other one is Kanahaa by Lahainaluna, the 2 streams come down from each side and she comes narrow coming out over here then goes out to one reaching the bottom.

KT- Let's start from the beginning. What is your full name?

C – Full name is Earl Ray Kanakaonahe Kukahiko.

KT – When were you born?

C – Dec. 16, 1930 in Lahaina. I'll be 75 in Dec. Add: 152 Malanai St. ph: 661-3460.

KT – Thomas Cummings, Bishop Museum Education Director suggested we visit you to give us background on why you folks (students of Lahainaluna) went down to Kahoma Stream when you were students at Lahainaluna. He said they use to get the cows every morning to milk.

C – We went down to pick koa every morning about 5am to collect koa seedlings to feed the cattle. About 100 lbs. If less, had to go back and get more so that it would weigh 100 lbs. That was our regular chores. The luna there was kepani. I graduated in 52 and became a luna. In 51, I had the job already. I became a counselor for the high school boarding students.

KT – What can you tell me about Kahoma?

C – There was a plantation camp down there. What we had to do was cross Kanaha first and then there was that island.

KT – Kanaha was as high as the school?

C – O yeah, way up.

KT – So where does Kahoma start.

C – Below the school. Where that island is there is a cinder pit up there. There is a road that takes you up to Kahoma to go into the valley and to the island in Kahoma. -- owned a portion of that. Frank Silva was the luna for the plantation. He was always the one who would come and talk story. I asked him who owned this land because I knew Lahainaluna use to own all this land down to the ocean.

KT – Who owned Lahainaluna

C – The STATE. Before that was the missionaries. Mr. Silva showed me the map of Kanaha and next to it Kahoma. One day, I wanted to go and see. I wanted to know and I found out get plenty water come down because of these two streams.

KT – So the source of these two streams was Pu'u Kukui?

C – Yea. Every day we talk story (Silva) Nalaelua, from the Keahi Ohana, own a portion up there. We use to send our cows down Kanaha. Mr. Silva said he had a small piece of land down there. They use to raise the taro on the land in Kahoma. Where they were had taro but from Lahainaluna down was the schools. On the other side had a lot of kuleana lands. The Sharpes, Kekuewas, they all own inside there but nobody come back they land all inside there so nobody knows who own's that but in my mind I know who owns that but they no come back. When I talk to the Kekuewa girls, e Ramsay, you guys don't want ???? Their response is they live on O'ahu and not interested. Nobody wants to come back. That's the thing now. The right of way to go on the property. There should be a right of way because when we use to go up, there was a right of way to go inside. They gotta go talk to the school. Anyway, that was the kuleana in there and it was aaall taro patch. We all use to go in there, all families, good friends, aunty Kamehameha, the Amarals, we had a long house, your family over here, your family over there, sleep. The mothers were the ones who prepared the food, it was fun days and all that while the men and children worked the taro patches. Mr. Silva talked to me about a lot of stuff and told me that during the war, Lahainaluna School was used as a hospital. They put in a big sewer and he showed me, it's where they are building now. When they were going to dig a new one, I went up to the school to show the principal, they called the State inspector and they identified the sewer. The bulldozer operator was going to mow it down because the plans didn't show it. The operator Bergau from Hana stopped the job. The himakamaka, the State, the County all came up to check and I let them know that my friend Silva told me about it. After they properly identified the sewer, they changed the manhole plans. Coming back to Kahoma, I didn't know about the two streams Kanaha & Kahoma. That's the ones, the people lived up there and planted gardens near the stream beds. Lots of people used to walk to school from up there since there weren't any buses. Some of the students from that area used to complain because they had to cross two streams, Kahoma & Kanaha.

KT – So when the water was high, they no come school?

C – No can, they no can cross. But the Lahainaluna one they had a phloom to water the cane and that comes from Kahoma.

KT – When Tom Cummings was talking about Kahoma, he said that the students were assigned to go down to Kahoma to plant taro to eat.

C – Well, that was the old days. Yea, my papa was up there and graduated in 1910.

KT – Did he tell you that?

C – Oh yeah. They had all the taro beds. The principal @ that time wanted that. The guys who living up there, that's Lahainaluna property, the plantation went and claimed that and put it on the map. I talked to the guy HANS, and questioned how they own all the lands up there.

095057 Second pod

C – These are the kind of things I learned from my Dad. How to do things the right way and not to hana 'ino the culture. That's why there is a lot of people that call me and I go, sometimes I read the Bible. Lot of people appreciate that. Sometimes I can sense things from the knowledge that I have. Lot of people appreciate. Some people going build a house so they call because they say I am highly recommended. Sometimes they find bones so they took care of it.

KT – We know that when people take advantage, there are ramifications that need to be made.

C – First thing is to Pule to have ke Akua help me. Then I do blessing on them. If unusual things still occur, please call. When I see people in Wailuku, they mention that pule have helped them. Sometimes people, Kepani from Kula and Makawao call and I go and help.

KT – Who were important people in Lahaina.

C – Pua and Ned Lindsey. Pua taught me many things.

KT – Where did she get her knowledge come from?

C – She was Big Island. Ned was great man. They both worked today. 11:07

KT – What are the cultural things passed down to you that people should know?

C – They passed down their knowledge to me. My dad passed to me and Pua.

KT – What was her focus/expertise, la'au, mahi'ai, etc?

C – Hers was more mahi'ai. When I asked, "You sure," her response was that is the way she was brought up. She was really really nice. We worked good together.

KT – Are they older than you?

C – Oh yeah. She was in her 80's when she passed.

KT – What were some of the events you would people to remember?

C – They were good decorators, whenever there was an activity, auntie Pua would get the call. She and the husband would get it done. The things they did was beautiful. Auntie Pua, no matter how big she was, she was a graceful dancer. That's why the daughter Rozelle was a good entertainer.

KT – Now that you bring that up, what about Emma Sharpe?

C – Emma Sharpe was more of an entertainer and not a decorator. That was the difference. Emma good entertainer, Pua good decorator.

KT – Let me go through some Hawaiian cultural things since Lahaina is rich in that area. We know that Kamehameha the Great after conquering Maui came back and resided in Lahaina for a year or more. We know that his canoes beached right on the 'aina/shore. However, the lower part of Lahaina was all wet lands and kalo.

KT – So where was the community? They lived above?

C – RIGHT. Very few people lived down. They were the ones that really helped the King. They were the suppliers of all the food(middle men).

KT – Again, when the foreigners came, the valley people were the ones who supplied the sailors with food and water, all the needs. I appreciate you confirming that it was the lifestyle and kuleana of the West Maui people. All these valleys used to supply the newcomers.

KT – Let's go deeper into culture. Mokuhinia. As you were growing up, what is your memory of Mokuhinia and Moku'ula?

C – My memory was more of Honokohua. I came to Lahainaluna in 1947 as a student and p/u all these things that was going on but my dad and Sam Makekau, fire chief told me that where Waiola Church was all water up to the water pump and to the village of Waine'e. Ships use to come all the way up to Waiola Church to baseball park to Mokuhinia.

KT – In your day, traveling was difficult so you stayed in your ahupua'a.

C – RIGHT.

KT – How long did it take you folks to come to Lahaina?

C – When we use to walk from Honokohua, it use to take us about hour and a half to two hrs. to reach Lahaina. We walked on the rock road. Wasn't macadamized yet since the county took care of the road.

KT -Before the paving, what kind of cars were there?

C – Model T's. Lot's of Model T's & Model A's. We had a Model T.

KT – Was trains running by then?

C – No, No! Trains came after when the sugar came in, it then went out to Honokohua to p/u the pineapple to take to the Lahaina Cannery. Sometime we walked, other times hitch hike.

KT – You boarded up there so it was convenient. What were some of the other influential immigrant cultures.

C – When the Chinese came, some of them settled in Honokohau right where the Church was then they started moving to Lahaina, they were all single men. They were planting opium in the water way back then brought from China. When Pakalolo started, it was in the rabbit food and got all the animals hyppered.

KT – Plantation people Pioneer Mill was - -Pauwela-pineapple from Upcountry Kahului – Pineapple from upcountry

C – When we were born had mid-wives. Name came out Kapalua @ Ritz-Carlton given by Mr. Fleming. Before, it was called Honokohua. There was a scout camp there. Many people who have moved off Maui that lived @ Honokohua ask about Kapalua when they return for a visit and are surprised to find the name change from Honokohua to Kapalua. Our house was the last house @ the corner with the coconut trees that my dad planted next to the store. My father gained his theology training by remaining another year @ Lahainaluna. My dad was a luna in the pineapple field. He served at Paia pineapple & Makena fishing before Fleming invited him home. First day of work, he saddled and prepared the horses. His boss asked, "How did you do that so fast?" His father's response. I learned it @ Lahainaluna. At Paia Church, he learned more about ke Akua.

APPENDIX F.

2007 Traffic Impact Analysis Report

Traffic Impact Report

Kahoma Residential Development



Prepared For
West Maui Land
Company, Inc.

Prepared By
Wilson Okamoto
Corporation

October 2007

TRAFFIC IMPACT REPORT
FOR THE
KAHOMA RESIDENTIAL DEVELOPMENT

Prepared for:

West Maui Land Company, Inc.
33 Lono Avenue, Suite 450
Kahului, Hawaii 96732

Prepared by:

Wilson Okamoto Corporation
1907 South Beretania Street
Honolulu, Hawaii 96826
WOC Ref: #7481-02

October 2007

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to assess anticipated traffic conditions resulting from the proposed Kahoma Residential Development located east of Honoapiilani Highway in Lahaina on the island of Maui. The project entails the development of 25 special needs multi-family rental units and 70 single-family residential lots.

B. Scope of Study

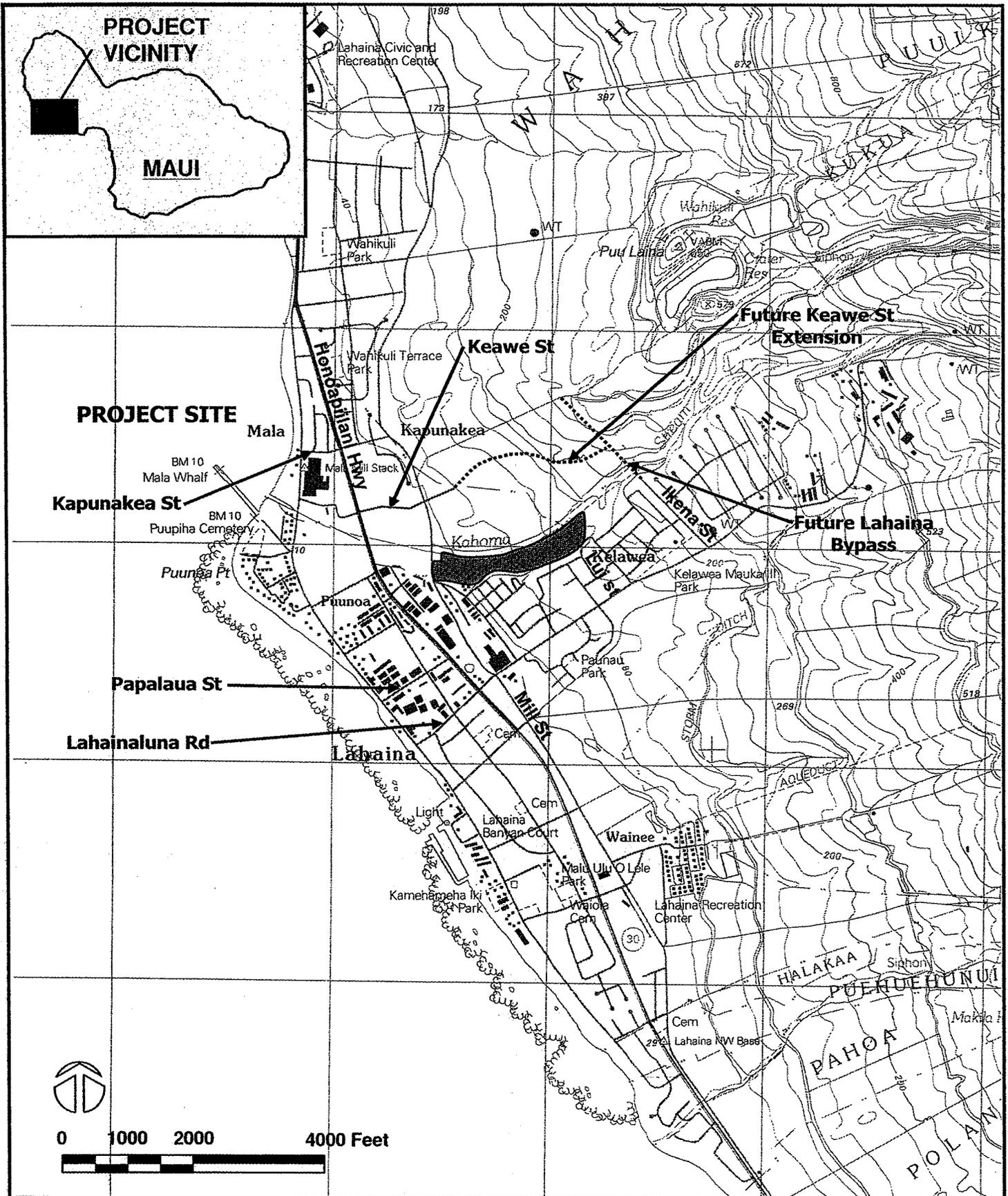
This report presents the findings and conclusions of the traffic study, the scope of which includes:

1. Description of the proposed project.
2. Evaluation of existing roadway and traffic operations in the vicinity.
3. Analysis of future roadway and traffic conditions without the proposed project.
4. Analysis and development of trip generation characteristics for the proposed project.
5. Superimposing site-generated traffic over future traffic conditions.
6. The identification and analysis of traffic impacts resulting from the proposed project.
7. Recommendations of improvements, if appropriate, that would mitigate the traffic impacts resulting from the proposed project.

II. PROJECT DESCRIPTION

A. Location

The project site for the proposed Kahoma Residential Development is located east of Honoapiilani Highway between Lahainaluna Road and the Kahoma Stream. The project site is further identified as Tax Map Keys: (2) 4-5-10: 5 and 6 (see Figure 1). Access to the project site would be via provided via connections to the local roadway network on the west and east ends of the project site.




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KAHOMA RESIDENTIAL DEVELOPMENT
 Location Map and Vicinity Map

FIGURE
 1

B. Project Characteristics

The proposed Kahoma Residential Development will be located on an approximately 16.8-acre site bordered by the Kahoma Stream to the north and existing residential homes to the south. The proposed project is expected to be completed by the Year 2011 and includes 25 special needs multi-family rental units and 70 single-family residential lots. The one-bedroom special needs units will provide independent living opportunities to qualified individuals. Access to Kahoma Residential Development will be provided via roadway connections on the west and east ends of the project site. Access to the west end of the project site will be provided via Mill Street and Keawe Street while access at the east end will be provided via Lui Street and Lahainaluna Road. Figure 2 shows the project site plan.

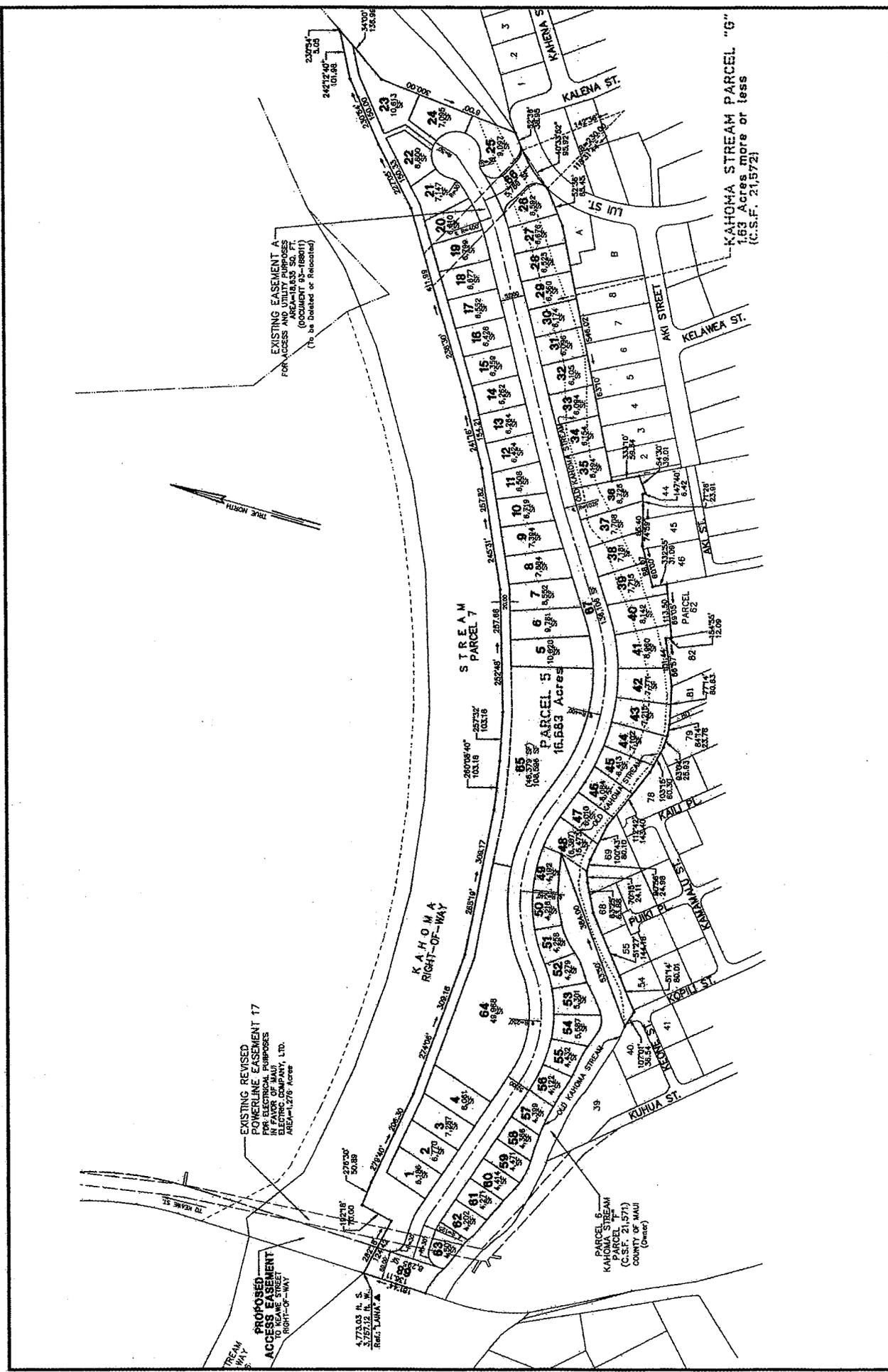
III. EXISTING CONDITIONS

A. General

The proposed project site is located approximately east of Honoapiilani Highway north of Lahainaluna Road. Honoapiilani Highway serves as a major collector roadway through central Maui and along the northwest coast of the island from its origin in Wailuku to its terminus near the north shore of Maui. In the project vicinity, Honoapiilani Highway is generally linked to east-west roadways that serve the surrounding residences, resort areas, agricultural lands, and commercial areas.

B. Area Roadway System

In the vicinity of the proposed project, Honoapiilani Highway is primarily a two-way, four-lane, undivided State of Hawaii roadway generally oriented in the north-south direction. At the signalized intersection with Kapunakea Street on the northern end of the project study area, both approaches of the highway have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Kapunakea Street is generally a two-lane, two-way County of Maui roadway that originates near the coast at Front Street and continues northeast past the intersection with the highway to its terminus at Nahale Place. At the intersection with Honoapiilani Highway, the westbound approach of Kapunakea Street has an exclusive





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KAHOMA RESIDENTIAL DEVELOPMENT

PROJECT SITE PLAN

FIGURE

2

left-turn lane and a shared through and right-turn lane while the eastbound approach includes a shared left-turn and through lane, and an exclusive right-turn lane.

South of the intersection with Kapunakea Street, Honoapiilani Highway intersects Keawe Street and the Lahaina Cannery Mall driveway. At this signalized intersection, the northbound approach of the highway has exclusive turning lanes and two through lanes while the southbound approach has an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Keawe Street is generally a two-lane, two-way County of Maui roadway that provides access to an adjacent industrial area. At the intersection with the highway, the Keawe Street approach has an exclusive right-turn lane and a shared left-turn and through lane. The eastbound approach of this intersection is comprised of the Lahaina Cannery Mall driveway which has an exclusive right-turn lane and a shared left-turn and through lane.

South of the intersection with Keawe Street, Honoapiilani Highway intersects Papalaua Street. At this signalized intersection, both approaches of the highway have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Papalaua Street is generally a two-lane, two-way County of Maui roadway generally oriented in the east-west direction between Front Street and the highway. At the intersection with Honoapiilani Highway, the eastbound approach of Papalaua Street has an exclusive right-turn lane and a shared left-turn and through lane while the westbound approach has one lane that serves all traffic movements.

At the southern end of the project study area, Honoapiilani Highway intersects Lahainaluna Road. At this signalized intersection, both approaches of the highway have an exclusive left-turn lane, one through lane, and a shared through and right-turn lane. Lahainaluna Road is a predominately two-lane, two-way County of Maui roadway generally oriented in the east-west direction between its origin at Front Street and its terminus near Lahainaluna High School. At the intersection with the highway, the westbound approach has exclusive turning lanes and one through lane while the eastbound approach has an exclusive left-turn lane and a shared through and right-turn lane.

C. Traffic Volumes and Conditions

1. General

a. Field Investigation

The field investigations were conducted on September 13 & 20, 2007. The field investigation consisted of manual intersection turning movement count surveys and field observations of traffic conditions in the vicinity. The traffic count surveys were conducted between the morning peak hours of 6:15 AM and 8:30 AM, and between the afternoon peak hours of 3:00 PM and 6:00 PM at the following intersections:

- Honoapiilani Highway and Kapunakea Street
- Honoapiilani Highway, Keawe Street, Lahaina Cannery Mall Driveway
- Honoapiilani Highway and Papalaua Street
- Honoapiilani Highway and Lahainaluna Road

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the "Highway Capacity Manual", Transportation Research Board, 2000, and the "Highway Capacity Software", developed by the Federal Highway Administration. The analysis is based on the concept of Level of Service (LOS).

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS "A" through "F". LOS "A" represents ideal or free-flow traffic operating conditions and LOS "F" represents unacceptable or potentially congested traffic operating conditions. LOS "B", "C", "D", and "E" represent the intermediate traffic operational characteristics between the two extremes of LOS "A" and LOS "F". The LOS definitions are included in Appendix B.

“Volume-to-Capacity” (v/c) ratio is another measure indicating the relative traffic demand to the roadway carrying capacity. A v/c ratio of one (1.00) indicates that the roadway is operating at or near capacity. A v/c ratio of greater than 1.00 generally indicates that the traffic demand exceeds the road’s carrying capacity.

2. Existing Peak Hour Traffic

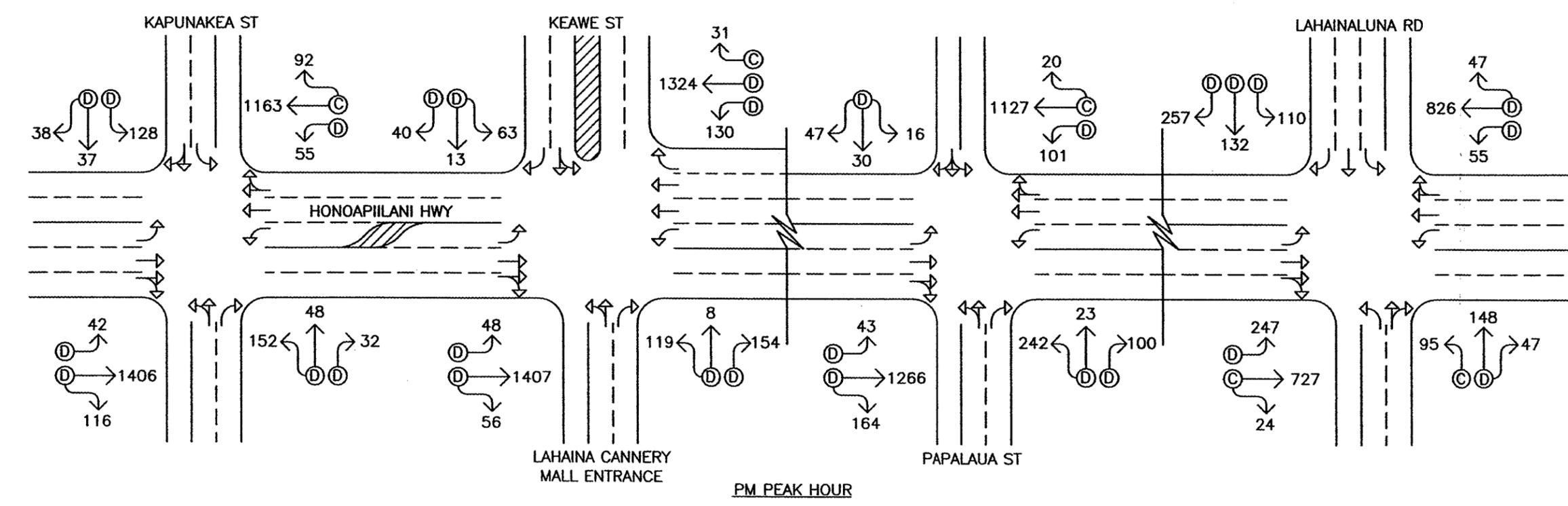
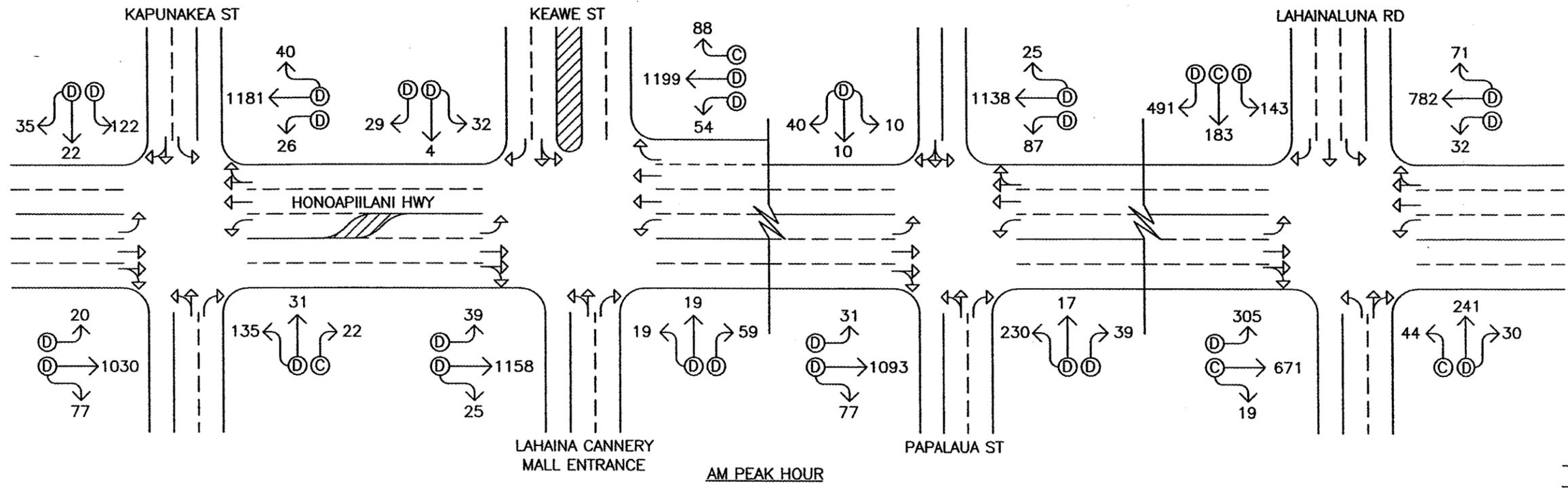
a. General

Figure 3 shows the existing AM and PM peak hour traffic volumes and traffic operating conditions along Honoapiilani Highway in the project vicinity. The morning peak hour of traffic generally occurs between 7:00 AM and 8:00 AM in the project vicinity and represents commuter, as well as, school-related traffic. In the afternoon, the peak hour of traffic generally occurs between the hours of 3:00 PM and 4:00 PM in the project vicinity. Although the peak hours of traffic generally occur around the same time periods at each of the study intersections, the absolute commuter peak hour time periods for each intersection may differ slightly as shown in Table 1.

Table 1: Peak Hours of Traffic

Intersection	AM Peak	PM Peak
Honoapiilani Hwy/ Kapunakea St	7:00 AM-8:00 AM	3:15 PM-4:15 PM
Honoapiilani Hwy/ Keawe St/Lahaina Cannery Mall Dwy	7:00 AM-8:00 AM	3:15 PM-4:15 PM
Honoapiilani Hwy/ Lahainaluna Rd	7:00 AM-8:00 AM	3:00 PM-4:00 PM

The analysis is based on the above absolute commuter peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.



LEGEND

90 ↗ TRAFFIC MOVEMENT VOLUME (VPH)

↔ LANE USAGE

Ⓐ LANE GROUP LEVEL OF SERVICE

DATE OF COUNT: September 13 & 20, 2007



KAHOMA RESIDENTIAL DEVELOPMENT

EXISTING AM AND PM PEAK HOURS OF TRAFFIC

b. Honoapiilani Highway and Kapunakea Street

At the intersection with Kapunakea Street, Honoapiilani Highway carries 1,247 vehicles northbound and 1,127 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 1,310 vehicles traveling northbound and 1,564 vehicles traveling southbound. The critical movements on the highway approaches of the intersection are the northbound left-turn traffic movement and the traffic movements on the southbound approach which operate at LOS "D" during both peak periods of traffic. Traffic queues periodically formed on the highway approaches of the intersection with the most significant queuing occurring during the PM peak period. Average queue lengths of 10-12 vehicles were observed on both approaches during this peak period. Most of these queues cleared the intersection after each traffic signal cycle change, but occasionally vehicles had to wait for more than one traffic signal cycle length.

The Kapunakea Street approaches of the intersection carry 188 vehicles eastbound and 179 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are slightly higher with 232 vehicles traveling eastbound and 203 vehicles traveling westbound. The critical movements on the Kapunakea Street approaches of the intersection are the eastbound left-turn and westbound left-turn and through traffic movements which operate at LOS "D" during both peak periods of traffic. Traffic queues periodically formed on the Kapunakea Street approaches of the intersection with average queue lengths of 5-7 vehicles observed on both approaches during the AM and PM peak hours of traffic. However, these queues were observed to clear the intersection after each traffic signal cycle change during both peak hours of traffic.

c. Honoapiilani Highway, Keawe Street, and the Lahaina Cannery Mall Driveway

At the intersection with Keawe Street and the Lahaina Cannery Mall driveway, Honoapiilani Highway carries 1,341 vehicles northbound and 1,222 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 1,485 vehicles traveling northbound and 1,511 vehicles traveling southbound during the PM peak period. The critical movements on the highway approaches of the intersection are the northbound left-turn and southbound through and right-turn traffic movements which operates at LOS "D" during both peak periods of traffic. Traffic queues periodically formed on the highway approaches of the intersection with the most significant queuing occurring during the PM peak period. Average queue lengths of 8-10 vehicles were observed on both approaches during this peak period. Most of these queues cleared the intersection after each traffic signal cycle change, but occasionally vehicles had to wait for more than one traffic signal cycle length.

The Keawe Street approach of the intersection carries 65 and 116 vehicles westbound during the AM and PM peak periods, respectively. The traffic movements on the Keawe Street approach operate at LOS "D" during both peak periods of traffic. Traffic queues periodically formed on the Keawe Street approach of the intersection with average queue lengths of 1-2 vehicles were observed during the AM and PM peak hours of traffic. These queues were observed to clear the intersection after each traffic signal cycle change during both peak hours of traffic.

The eastbound approach of the intersection is comprised of the Lahaina Cannery Mall driveway which carries 97 vehicles and 281 vehicles eastbound during the AM and PM peak periods, respectively.

The traffic movements on the driveway approach of the intersection operate at LOS "D" during both peak periods. Traffic queues periodically formed on the driveway approach of the intersection with average queue lengths of 3-5 vehicles were observed during the AM and PM peak hours of traffic. These queues were observed to clear the intersection after each traffic signal cycle change during both peak hours of traffic.

d. Honoapiilani Highway and Papalaua Street

At the intersection with Papalaua Street, Honoapiilani Highway carries 1,250 vehicles northbound and 1,201 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 1,248 vehicles traveling northbound and 1,473 vehicles traveling southbound. The critical movements on the highway approaches of the intersection are the northbound left-turn and southbound through and right-turn traffic movements which operate at LOS "D" during both peak periods. Traffic queues periodically formed on the highway approaches of the intersection with the most significant queuing occurring on the southbound approach of the intersection. Average queue lengths of 8-10 vehicles were observed on this approach during both peak periods and, occasionally, queues from the downstream intersection with Lahainaluna Road extended through the intersection. Most of these queues cleared the intersection after each traffic signal cycle change, but occasionally vehicles had to wait for more than one traffic signal cycle length.

The Papalaua Street approaches of the intersection carry 286 vehicles eastbound and 60 vehicles westbound during the AM peak period. During the PM peak period, traffic volumes are higher with 365 vehicles traveling eastbound and 93 vehicles traveling westbound. The critical movements on the Papalaua Street approaches of the intersection are the eastbound left-turn and through traffic movement

and the traffic movements on the westbound approach which operate at LOS "D" during both peak periods. Traffic queues periodically formed on the Papalaua Street approaches of the intersection with the most significant queuing occurring on the eastbound approach of the intersection. Average queue lengths of 5-7 vehicles were observed during the AM and PM peak hours of traffic. These queues were observed to clear the intersection after each traffic signal cycle change during both peak hours of traffic.

e. Honoapiilani Highway and Lahainaluna Road

At the intersection with Lahainaluna Road, Honoapiilani Highway carries 885 vehicles northbound and 995 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is slightly higher with 928 vehicles traveling northbound and 998 vehicles traveling southbound. The critical movements on the highway approaches of the intersection are the northbound through and right-turn traffic movement and the southbound left-turn traffic movement which operate at LOS "D" during both peak periods. Traffic queues periodically formed on the highway approaches of the intersection with the most significant queuing occurring on the southbound approach of the intersection. Average queue lengths of 8-10 vehicles were observed on this approach during both peak periods with queues occasionally extending through the upstream intersection with Papalaua Street. Most of these queues cleared the intersection after each traffic signal cycle change, but occasionally vehicles had to wait for more than one traffic signal cycle length.

The Lahainaluna Road approaches of the intersection carry 315 vehicles eastbound and 817 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is less with 290 vehicles traveling eastbound and 499 vehicles traveling

westbound. The critical movements of the Lahainaluna Road approaches are the westbound left-turn and right-turn traffic movements which operate at LOS "D" during both peak periods. Traffic queues periodically formed on the Lahainaluna Road approaches of the intersection with average queue lengths of 5-7 vehicles observed on both approaches during the AM and PM peak hours of traffic. Most of these queues cleared the intersection after each traffic signal cycle change, but occasionally vehicles had to wait for more than one traffic signal cycle length.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in "Trip Generation, 7th Edition," 2003. The ITE trip generation rates are developed empirically by correlating the vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit. Table 2 summarizes the project site trip generation characteristics applied to the AM and PM peak hours of traffic.

Table 2: Peak Hour Trip Generation

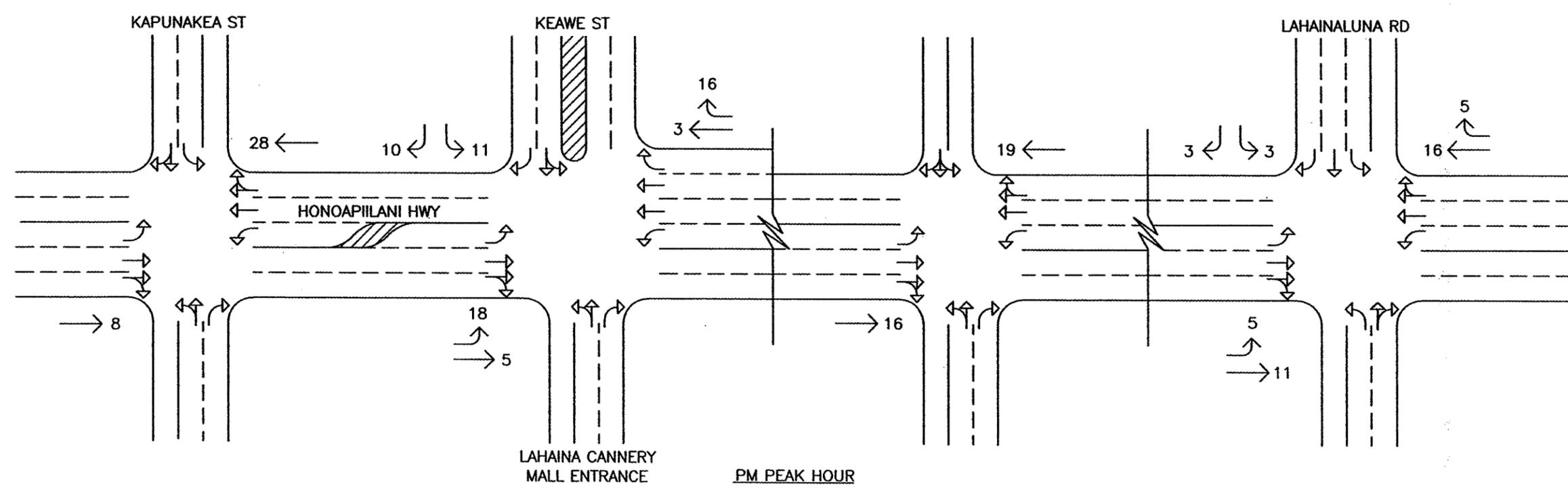
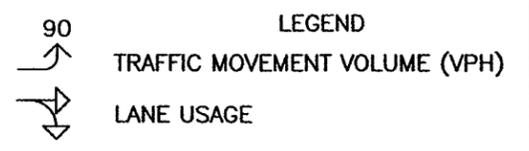
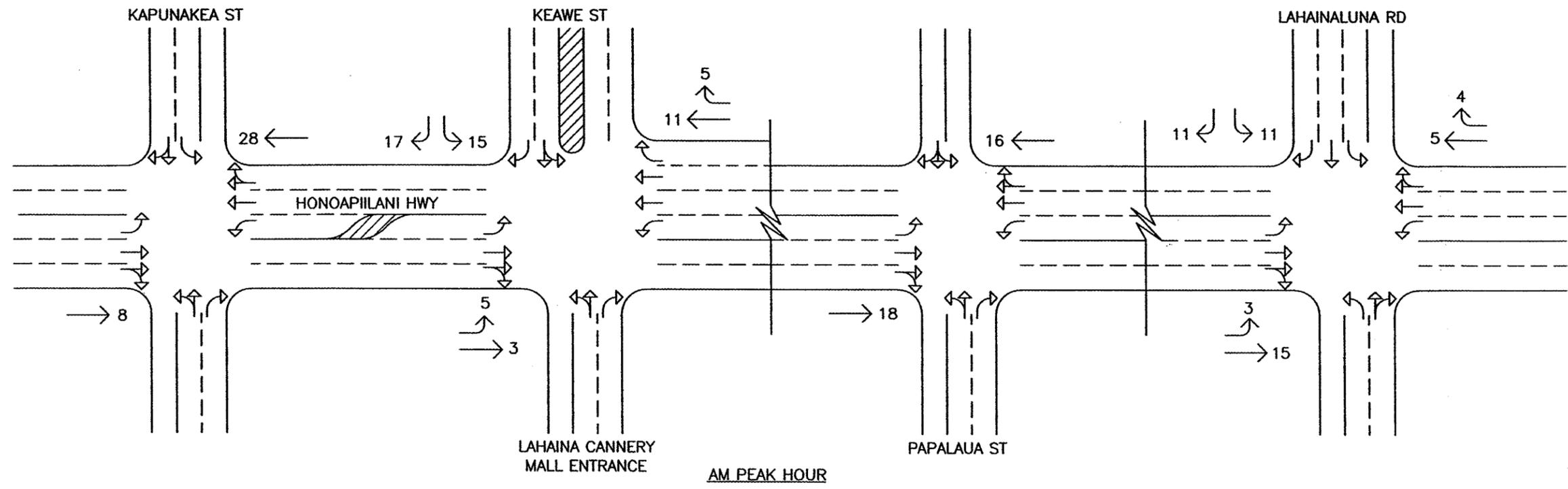
APARTMENT		# of dwelling units = 25
INDEPENDENT VARIABLE:		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	3
	EXIT	10
	TOTAL	13
PM PEAK	ENTER	10
	EXIT	6
	TOTAL	16

Table 2: Peak Hour Trip Generation (Cont'd)

SINGLE-FAMILY DETACHED HOUSING		
INDEPENDENT VARIABLE:		# of dwelling units = 70
		PROJECTED TRIP ENDS
AM PEAK	ENTER	14
	EXIT	44
	TOTAL	58
PM PEAK	ENTER	49
	EXIT	29
	TOTAL	78
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	17
	EXIT	54
	TOTAL	71
PM PEAK	ENTER	59
	EXIT	35
	TOTAL	94

2. Trip Distribution

Figure 4 shows the AM and PM peak hour traffic distribution of project site-generated traffic at each of the study intersections. Access to the project site will be provided via roadway connections on the west and east ends of the project site. The directional distribution of traffic was based on the prevalent distribution of traffic along Honoapiilani Highway. As such, 51.8 % were assumed to be traveling northbound and 48.2% were assumed to be traveling southbound during the AM peak period. Similarly, during the PM peak period, 47.8% were assumed to be traveling northbound and 52.2% were assumed to be traveling southbound. These vehicles were then distributed between the two roadway connections from the project site based on the proximity of the dwelling units to the connections and then routed to Honoapiilani Highway via Keawe Street or Lahainaluna Road.



KAHOMA RESIDENTIAL DEVELOPMENT

DISTRIBUTION OF SITE-GENERATED VEHICLES - AM AND PM PEAK HOURS OF TRAFFIC

FIGURE

4

B. Through Traffic Forecasting Methodology

The travel forecast is based upon the average annual traffic growth rate as described in the Maui Long-Range Land Transportation Plan (MLRLTP). The MLRLTP, prepared for the State of Hawaii Department of Transportation in cooperation with the County of Maui Department of Public Works and Planning Department, serves as a guide for the development of the major surface transportation facilities and programs to be implemented on Maui. The Plan identifies strategies and actions that will lead to the development of an integrated intermodal transportation system that facilitates the efficient movement of people and goods. Use of the MLRLTP more accurately reflects the anticipated impacts of traffic growth in the region than the use of historical traffic count data. Based upon statewide population, employment, and visitor forecasts to the Year 2020, the MLRLTP estimates that the average daily traffic along Honoapiilani Highway would increase at an average rate of approximately 1.6% per year. Using 2007 as the Base Year, a growth factor of 1.066 was applied to the existing through traffic demands along the highway to achieve the projected Year 2011 traffic demands.

C. Other Considerations

The following are other developments expected to be completed by the Year 2011 when the Kahoma Residential Development is anticipated to occur:

- Maui Breakers project in Mahinahina, which includes 90 multi-family affordable residential units, is expected to be completed in late 2005 or early 2006.
- Villas at Kahana Ridge development includes 117 multi-family residential units and is expected to be completed in Year 2005.
- Lokahi Pacific project in Lahaina with an expected completion in Year 2005. The Lokahi Pacific project includes 12 single-family residential units.
- North Beach Lot 1 project of the Kaanapali Ocean Resort subdivision, which includes a total of 280 timeshare units. At the time of the study, North Beach Lot 1 included 103 units, with the balance of 177 units currently under construction and soon to be completed.
- North Beach Lot 2 of Kaanapali Ocean Resort subdivision, located adjacent to North Beach Lot 1, is currently in the planning stages at this writing, and includes approximately 258 multi-family units with potential lockouts for each unit.

- Honua Kai, also referred to as North Beach Makai, Lot 4, located makai of Honoapiilani Highway in the vicinity of Lower Honoapiilani Road which includes a total of 700 multi-family units to be constructed in five phases, this first of which is expected to be completed by the Year 2011.
- Kaanapali Golf Estates Parcels 22 and 23 residential subdivision located mauka of Honoapiilani highway within the South Beach Mauka are will include 132 single-family recreational homes. Construction is expected to start mid-2005 with completion anticipated by Year 2007.
- Pioneer Farms Phases I and II residential subdivision located in Kaanapali, mauka of Honoapiilani Highway. The proposed project will include 108 residential lots with expected completion by Year 2008.
- Maui Preparatory Academy located mauka of Honoapiilani Highway with access to and from the highway via the Napilihau Street intersection. The project is expected to include a total of 540 students from pre-kindergarten to grade 12 with the expected completion by Year 2013. The project will be completed by three phases. The first two phases will include an enrollment of 198 students total with build-out in Year 2008. Therefore, only 198 students will be included in the trip-generation for this analysis.
- Pulelehua, a planned community located mauka of Honoapiilani Highway in the Mahinahina area. The project is expected to include 895 primary units with a potential of 318 additional Ohana-type units. Build-out for the Pulelehua project is expected to occur by the Year 2011.
- Residences at Kapalua Bay project located in Kapalua on the makai side of Honoapiilani Highway. The proposed project entails the redevelopment of the existing Kapalua Bay Hotel to include approximately 155, 2- and 3-bedroom units with expected completion by Year 2008.
- Villages at Lealii, a residential development by the Housing and Community Development Corporation of Hawaii that includes a total of 4,846 dwelling units, 2,006 single-family units and 2,840 multi-family units. Based on available data, it is assumed that approximately 104 residential units will be developed by Year 2011.
- Kihune, a residential development located in Napili that includes a total of 20 dwelling units. The proposed project is expected to be completed by Year 2011.
- Land Tech, a residential development located in Kaanapali. The proposed project entails 18 dwelling units with expected completion by Year 2011.
- Plantation Inn, a residential development located in Lahaina. The proposed project entails 14 dwelling units with expected completion by 2011.
- Royal Lahaina Resort project located in Kaanapali on the makai side of Honoapiilani Highway. The proposed project entails the revitalization of the existing resort to include approximately 330 hotel units in a 12-story tower and 125 condominium/hotel units in 11 new building with expected completion by Year 2009.

- Honolua Ridge is a 56-lot agricultural subdivision located within the Kapalua Resort area directly east of the existing Plantation Estates subdivision and the Plantation Golf Course. Currently, three homes are under construction. It is anticipated that a total of 12 homes will be constructed by Year 2011.
- Kaanapali 2020, a development to include approximately 2,800 residential dwelling units located on the slopes of the West Maui Mountains between Honokowai Stream and the Lahaina Civic Center, is expected to be completed by Year 2027. Construction of Phase I of the overall development is expected to start in Year 2007, and be completed by Year 2015. For the purpose of this study, approximately 50% of Phase I is assumed to be completed by the Year 2011.
- Westin Kaanapali Ocean Resort, Lot 3, also referred to as North Beach Makai, Lot 3, will include approximately 390 timeshare units located adjacent and immediately north of the existing Westin Kaanapali Ocean Resort, Lot 2. Buildout of the project is uncertain at this writing. However, for the purposes of this study, 75% of the total number of units are assumed to be completed by Year 2011.
- Kapalua Resort Site 6-0 is located adjacent to Lower Honoapiilani Road in Kapalua and includes the development of 58, 1-, 2-, and 3-bedroom units and approximately 35,000 square feet of light industrial uses. Construction is expected to be completed by Year 2008.
- Kapalua Central Resort is south of Office Road between Honoapiilani Highway and Lower Honoapiilani Road in Kapalua and includes the development of 196 residential homes, 61,008 square feet of commercial use, and 10,355 square feet of office use. Construction is expected to be completed by Year 2010.
- The Lahaina Cannery Mall is located adjacent to Honoapiilani Highway south of Kapunakea Street. The proposed expansion project includes an additional 33,160 square feet of development that is expected to be completed by the Year 2008.

The traffic generated by the above projects, as applicable, were estimated based on the generation rates and procedures identified in the Institute of Transportation Engineers publication on trip generation for specific land use types, and other traffic studies associated with each proposed development. The determined traffic generation was applied to the ambient traffic growth, thus incorporating these additional applicable projects in the baseline traffic conditions. The purpose of including traffic demands from these other developments is to obtain a more realistic traffic forecast model and to ensure that any adverse traffic operational impacts can be properly addressed. Thus, the traffic analysis would include the cumulative traffic demands on the roadways in the vicinity of the project at its build-out. Should there be additional developments not accounted for in the analysis, the average annual

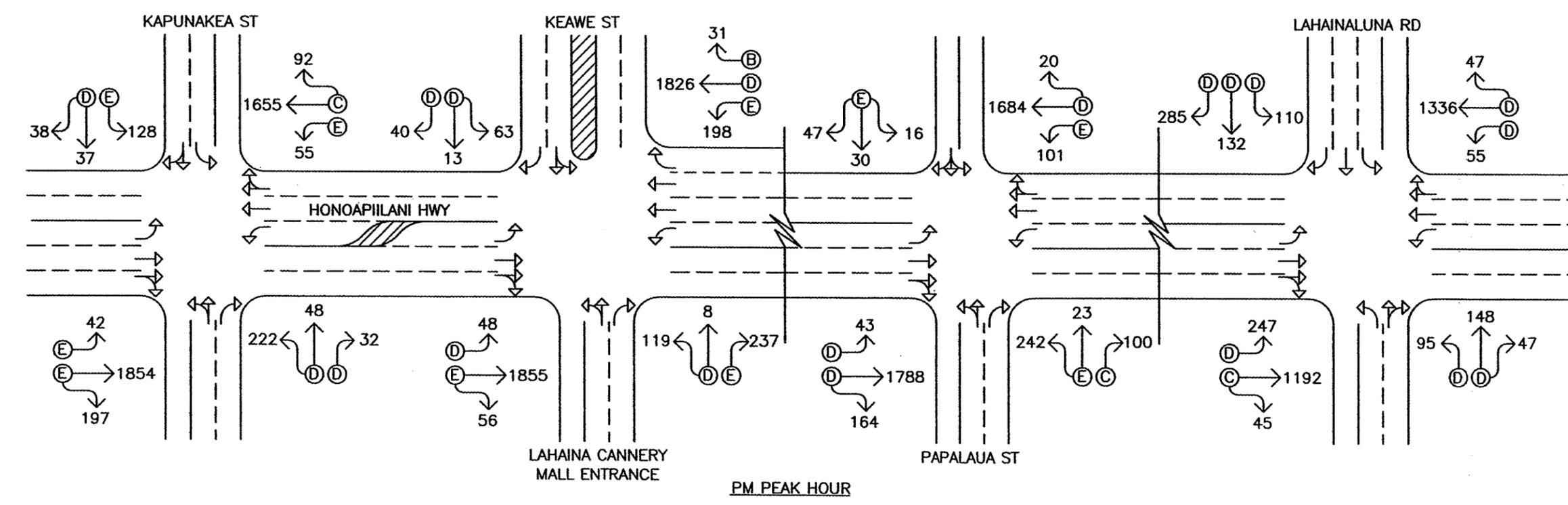
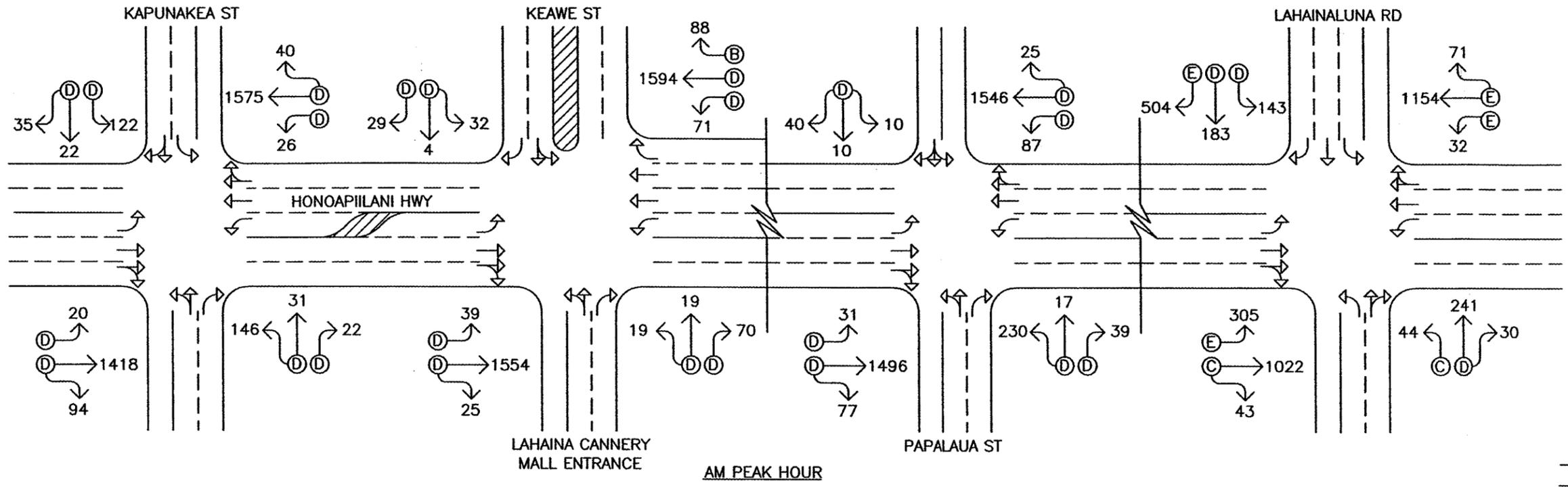
ambient traffic growth rate utilized in the traffic forecast is expected to encompass the increase traffic demands resulting from these unknown developments. Should there be no additional developments other than those stated above, including the average annual ambient growth rate would represent a conservative traffic analysis in terms of future traffic projections.

D. Traffic Operations Without Proposed Project

The projected Year 2011 AM and PM peak hour traffic volumes and operating conditions without the development of the proposed Kahoma Residential Development are shown on Figure 5 and summarized in Table 3. The levels of service shown in Table 3 include the projected growth in ambient traffic, as well as, the development of other projects in the vicinity. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.

Table 3: Existing and Projected (Without Project) Levels of Service

Intersection	Critical Traffic Movement		AM		PM	
			Exist	Year 2011 w/out Proj	Exist	Year 2011 w/out Proj
Honoapiilani Hwy/ Kapunakea St	Eastbound	LT-TH	D	D	D	D
	Westbound	LT	D	D	D	E
	Northbound	LT	D	D	D	E
	Southbound	LT	D	D	D	E
		TH-RT	D	D	D	E
Honoapiilani Hwy/ Keawe St/Lahaina Cannery Mall Dwy	Eastbound	LT-TH	D	D	D	D
		RT	D	D	D	E
	Westbound	LT-TH	D	D	D	D
		RT	D	D	D	D
	Northbound	LT	D	D	D	E
	Southbound	TH-RT	D	D	D	E



LEGEND

- 90 ↗ TRAFFIC MOVEMENT VOLUME (VPH)
- ↔ LANE USAGE
- Ⓐ LANE GROUP LEVEL OF SERVICE



KAHOMA RESIDENTIAL DEVELOPMENT

YEAR 2011 AM AND PM PEAK HOURS OF TRAFFIC WITHOUT PROJECT

Table 3: Existing and Projected (Without Project) Levels of Service (Cont'd)

Intersection	Critical Traffic Movement		AM		PM	
			Exist	Year 2011 w/out Proj	Exist	Year 2011 w/out Proj
Honoapiilani Hwy/ Papalaua St	Eastbound	LT-TH	D	D	D	E
	Westbound	LT-TH-RT	D	D	D	E
	Northbound	LT	D	D	D	E
	Southbound	TH-RT	D	D	D	E
Honoapiilani Hwy/ Lahainaluna Rd	Westbound	LT	D	D	D	D
		RT	D	E	D	D
	Northbound	TH-RT	D	E	D	D
	Southbound	LT	D	E	D	D

Under Year 2011 without project conditions, traffic operations in the project vicinity without the development of the project are expected, in general, to deteriorate from existing conditions during both peak periods of traffic due to ambient traffic growth and the development of other projects in the vicinity. The westbound right-turn traffic movement and the critical traffic movements on the northbound and southbound approaches of the intersection of Honoapiilani Highway with Lahainaluna Road are expected to deteriorate from LOS "D" to LOS "E" during the AM peak period. During the PM peak period, the critical traffic movements on the westbound, northbound, and southbound approaches of the intersection of Honoapiilani Highway with Kapunakea Street, as well as, the eastbound right-turn traffic movement and the critical traffic movements on the northbound and southbound approaches of the intersection with Keawe Street and the Lahaina Cannery Mall driveway are anticipated to deteriorate from LOS "D" to LOS "E." Similarly, the critical traffic movements at the intersection with Papalaua Street are anticipated to deteriorate from LOS "D" to LOS "E" during the PM peak period.

E. Traffic Operations With Proposed Project

The cumulative AM and PM peak hour traffic conditions resulting from the projected external traffic and the proposed Kahoma Residential Development are shown on Figure 6. The cumulative volumes consist of site-generated traffic superimposed over projected Year 2011 traffic demands. The traffic impacts resulting from the proposed project are addressed in the following section.

V. TRAFFIC IMPACT ANALYSIS

The Year 2011 cumulative AM and PM peak hour traffic conditions with the Kahoma Residential Development are summarized in Table 4. The existing and projected Year 2011 without project levels of service are included for comparison purposes. LOS calculations are included in Appendix E.

Table 4: Existing and Projected (Without and With Project) Levels of Service

Intersection	Critical Traffic Movement		AM			PM		
			Exist	Year 2011		Exist	Year 2011	
				w/out Proj	w/ Proj		w/out Proj	w/ Proj
Honoapiilani Hwy/ Kapunakea St	Eastbound	LT-TH	D	D	D	D	D	D
	Westbound	LT	D	D	D	D	E	E
	Northbound	LT	D	D	D	D	E	E
	Southbound	LT	D	D	D	D	E	E
		TH-RT	D	D	D	D	E	E
Honoapiilani Hwy/ Keawe St/Lahaina Cannery Mall Dwy	Eastbound	LT-TH	D	D	D	D	D	D
		RT	D	D	D	D	E	E
	Westbound	LT-TH	D	D	D	D	D	D
		RT	D	D	D	D	D	D
	Northbound	LT	D	D	D	D	E	E
	Southbound	TH-RT	D	D	D	D	E	E
Honoapiilani Hwy/ Papalaua St	Eastbound	LT-TH	D	D	D	D	E	E
	Westbound	LT-TH-RT	D	D	D	D	E	E
	Northbound	LT	D	D	D	D	E	E
	Southbound	TH-RT	D	D	D	D	E	E

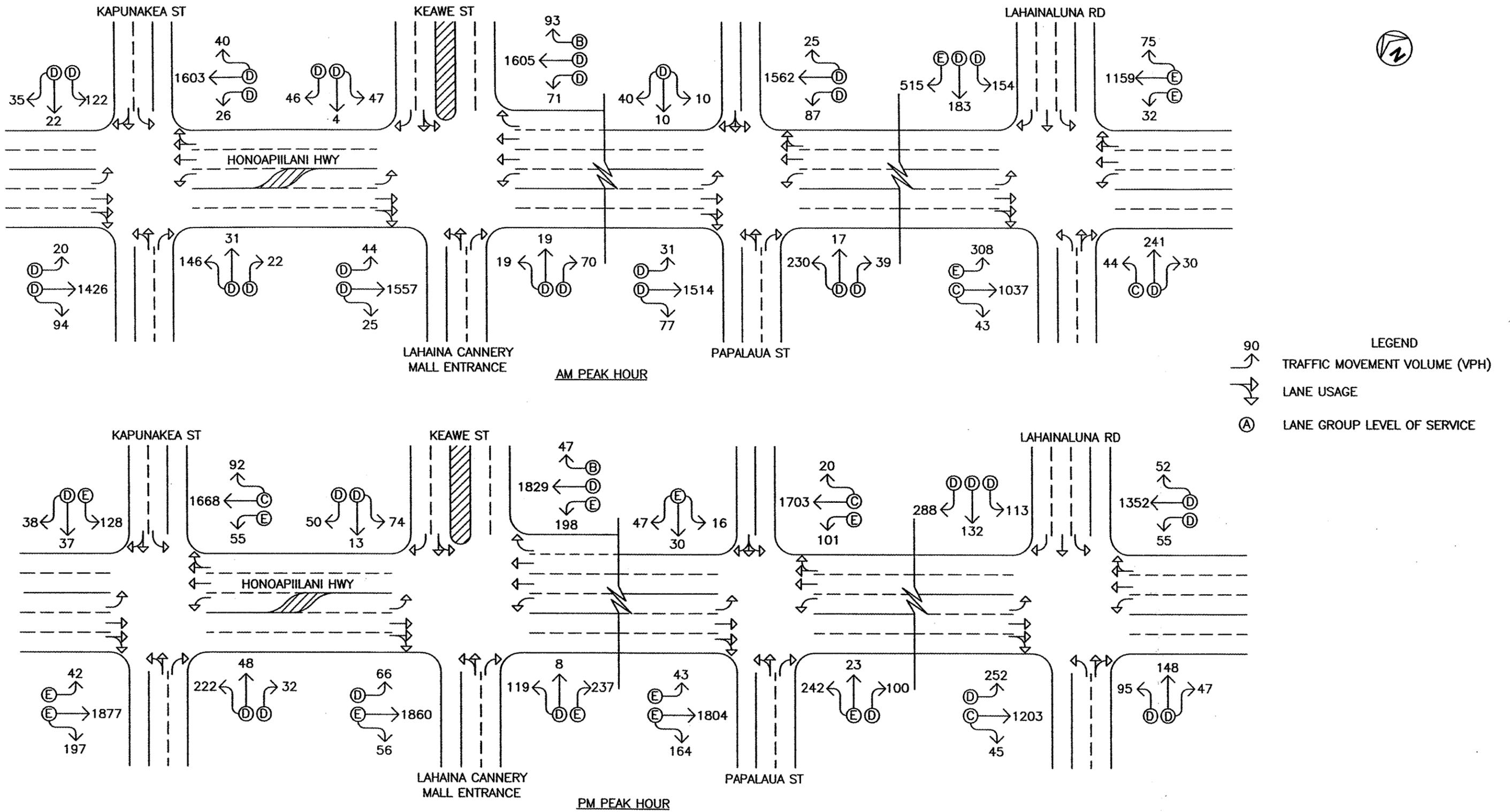


Table 4: Existing and Projected (Without and With Project) Levels of Service (Cont'd)

Intersection	Critical Traffic Movement		AM			PM		
			Exist	Year 2011		Exist	Year 2011	
				w/out Proj	w/ Proj		w/out Proj	w/ Proj
Honoapiilani Hwy/ Lahainaluna Rd	Westbound	LT	D	D	D	D	D	D
		RT	D	E	E	D	D	D
	Northbound	TH-RT	D	E	E	D	D	D
	Southbound	LT	D	E	E	D	D	D

Traffic operations in the vicinity of the proposed project are expected to remain similar to Year 2011 without project conditions. The critical movements at all of the study intersections are anticipated to continue operating at levels of service similar to without project conditions. Low levels of service are anticipated for the critical movements at intersection of the highway with Lahainaluna Road during the AM peak period, as well as, at the other three study intersections during the PM peak period without and with the proposed project due to the high volume of turning traffic at Lahainaluna Road and through traffic along Honoapiilani Highway. However, there are future plans to extend Keawe Street and connect it to Lahainaluna Road to provide an alternate route between the residential neighborhoods mauka of the highway. This alternate route is anticipated to reduce traffic at the intersection of Honoapiilani Highway with Lahainaluna Road thereby improving operating conditions at this intersection, as well as, reduce through traffic along Honoapiilani Highway north of Lahainaluna Road alleviating congestion along this corridor. In conjunction with the extension, intersection modifications are anticipated at the intersection with Keawe Street to accommodate the anticipated increase in traffic at that intersection. The westbound approach of Keawe Street is expected to be modified to provide exclusive turning lanes and one through lane. The projected Year 2011 AM and PM peak hour traffic conditions with the proposed Kahoma Residential Development and the construction of the Keawe Street Extension are summarized in Table 5. The projected Year 2011 with project operating conditions without the extension is provided for comparison purposes. LOS calculations are included in Appendix F.

**Table 5: Projected Year 2011 With Project (Without and With the Extension)
Levels of Service**

Intersection	Critical Traffic Movement		AM		PM	
			w/out Ext	w/Ext	w/out Ext	w/Ext
Honoapiilani Hwy/ Kapunakea St	Eastbound	LT-TH	D	D	D	D
	Westbound	LT	D	D	E	E
	Northbound	LT	D	D	E	E
	Southbound	LT	D	D	E	E
TH-RT		D	D	E	E	
Honoapiilani Hwy/ Keawe St/Lahaina Cannery Mall Dwy*	Eastbound	LT-TH	D	D	D	D
		RT	D	D	E	D
	Westbound	LT	D	D	D	D
		TH		D		D
		RT	D	D	D	D
	Northbound	LT	D	D	E	D
Southbound	TH-RT	D	D	E	D	
Honoapiilani Hwy/ Papalaua St	Eastbound	LT-TH	D	D	E	E
	Westbound	LT-TH-RT	D	D	E	E
	Northbound	LT	D	D	E	E
	Southbound	TH-RT	D	D	E	E
Honoapiilani Hwy/ Lahainaluna Rd	Westbound	LT	D	D	D	D
		RT	E	D	D	D
	Northbound	TH-RT	E	D	D	D
	Southbound	LT	E	D	D	D

*Intersection modifications implemented.

With the construction of the Keawe Street Extension, traffic operations at the study intersections along Honoapiilani Highway are expected, in general, to improve from without and with project (without extension) conditions. The most significant improvements are anticipated at the intersections of the highway with Keawe Street and Lahainaluna Road where the critical traffic movements are anticipated to operate at LOS "D" or better during both peak periods.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study associated with the proposed project to be incorporated during the design phase:

1. Maintain sufficient driveway width to accommodate safe vehicle ingress and egress.
2. Maintain adequate turning radii at all project driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
3. Maintain adequate sight distances for motorists to safely enter and exit all project driveways.
4. Maintain adequate on-site loading and off-loading services areas and prohibit off-site loading operations.

VII. CONCLUSION

The proposed Kahoma Residential Development is not expected to have a significant impact on traffic operations in the vicinity of the project site. The critical traffic movements at the study intersections are anticipated to continue operating at levels of service similar to without project conditions. In addition, the total traffic volumes entering the intersections along Honoapiilani Highway are expected to increase by less than 2% during both peak periods of traffic with the proposed residential development. These increases in the total traffic volumes are in the range of daily volume fluctuations along the highway and represent a minimal increase in the overall traffic volumes. In addition, there are future plans to extend Keawe Street to provide an alternate route between the residential neighborhoods mauka of the highway thereby alleviating traffic conditions along the highway.

APPENDIX A

EXISTING TRAFFIC COUNT DATA

WILSON OKAMOTO CORPORATION
 1907 S. Beretania Street, Suite 400
 Honolulu, HI 96826

Counter: D4-3889, D4-3890
 Counted: EK, ER
 Clear

File Name : KapHonoPM
 Site Code : 00000001
 Start Date : 9/20/2007
 Page No : 1

Start Time	Groups Printed- Unshifted																
	Honoapiilani Highway Southbound				Kapunakea Street Westbound				Honoapiilani Highway Northbound				Kapunakea Street Eastbound				
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	3	303	20	326	23	7	5	35	12	278	20	310	43	14	9	66	737
03:15 PM	10	349	33	392	31	8	6	45	16	288	17	321	37	11	9	57	815
03:30 PM	12	354	25	391	47	10	14	71	16	295	28	339	40	14	7	61	862
03:45 PM	5	307	20	332	29	7	10	46	13	299	26	338	47	10	6	63	779
Total	30	1313	98	1441	130	32	35	197	57	1160	91	1308	167	49	31	247	3193
04:00 PM	15	396	38	449	21	12	8	41	10	281	21	312	28	13	10	51	853
04:15 PM	7	310	36	353	35	8	12	55	15	264	31	310	51	10	9	70	788
04:30 PM	5	322	25	352	31	7	9	47	12	284	24	320	37	10	12	59	778
04:45 PM	10	262	31	303	33	3	16	52	15	295	27	337	42	15	6	63	755
Total	37	1290	130	1457	120	30	45	195	52	1124	103	1279	158	48	37	243	3174
05:00 PM	13	264	36	313	20	11	10	41	13	268	31	312	45	16	8	69	735
05:15 PM	9	255	40	304	33	6	9	48	20	238	33	291	31	8	11	50	693
05:30 PM	7	273	35	315	28	11	8	47	12	239	23	274	32	12	2	46	682
05:45 PM	3	237	31	271	22	8	7	37	12	195	14	221	43	11	2	56	585
Total	32	1029	142	1203	103	36	34	173	57	940	101	1098	151	47	23	221	2695
Grand Total	99	3632	370	4101	353	98	114	565	166	3224	295	3685	476	144	91	711	9062
Apprch %	2.4	88.6	9		62.5	17.3	20.2		4.5	87.5	8		66.9	20.3	12.8		
Total %	1.1	40.1	4.1	45.3	3.9	1.1	1.3	6.2	1.8	35.6	3.3	40.7	5.3	1.6	1	7.8	

Start Time	Honoapiilani Highway Southbound												Honoapiilani Highway Northbound											
	Kapunakea Street Westbound				Honoapiilani Highway Southbound				Kapunakea Street Eastbound				Honoapiilani Highway Northbound				Kapunakea Street Eastbound							
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total							
03:15 PM	10	349	33	392	31	8	6	45	16	288	17	321	37	11	9	57	815							
03:30 PM	12	354	25	391	47	10	14	71	16	295	28	339	40	14	7	61	862							
03:45 PM	5	307	20	332	29	7	10	46	13	299	26	338	47	10	6	63	779							
Total	30	1313	98	1441	130	32	35	197	57	1160	91	1308	167	49	31	247	3193							
04:00 PM	15	396	38	449	21	12	8	41	10	281	21	312	28	13	10	51	853							
04:15 PM	7	310	36	353	35	8	12	55	15	264	31	310	51	10	9	70	788							
04:30 PM	5	322	25	352	31	7	9	47	12	284	24	320	37	10	12	59	778							
04:45 PM	10	262	31	303	33	3	16	52	15	295	27	337	42	15	6	63	755							
Total	37	1290	130	1457	120	30	45	195	52	1124	103	1279	158	48	37	243	3174							
05:00 PM	13	264	36	313	20	11	10	41	13	268	31	312	45	16	8	69	735							
05:15 PM	9	255	40	304	33	6	9	48	20	238	33	291	31	8	11	50	693							
05:30 PM	7	273	35	315	28	11	8	47	12	239	23	274	32	12	2	46	682							
05:45 PM	3	237	31	271	22	8	7	37	12	195	14	221	43	11	2	56	585							
Total	32	1029	142	1203	103	36	34	173	57	940	101	1098	151	47	23	221	2695							
Grand Total	99	3632	370	4101	353	98	114	565	166	3224	295	3685	476	144	91	711	9062							
Apprch %	2.4	88.6	9		62.5	17.3	20.2		4.5	87.5	8		66.9	20.3	12.8									
Total %	1.1	40.1	4.1	45.3	3.9	1.1	1.3	6.2	1.8	35.6	3.3	40.7	5.3	1.6	1	7.8								

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 03:15 PM

Start Time	Honoapiilani Highway Southbound												Honoapiilani Highway Northbound											
	Kapunakea Street Westbound				Honoapiilani Highway Southbound				Kapunakea Street Eastbound				Honoapiilani Highway Northbound				Kapunakea Street Eastbound							
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total							
03:15 PM	10	349	33	392	31	8	6	45	16	288	17	321	37	11	9	57	815							
03:30 PM	12	354	25	391	47	10	14	71	16	295	28	339	40	14	7	61	862							
03:45 PM	5	307	20	332	29	7	10	46	13	299	26	338	47	10	6	63	779							
04:00 PM	15	396	38	449	21	12	8	41	10	281	21	312	28	13	10	51	853							
Total	42	1406	116	1564	128	37	38	203	55	1163	92	1310	152	48	32	232	3309							
% App. Total	2.7	89.9	7.4		63.1	18.2	18.7		4.2	88.8	7		65.5	20.7	13.8									
PHF	.700	.888	.763	.871	.681	.771	.679	.715	.859	.972	.821	.966	.809	.857	.800	.921	.960							

WILSON OKAMOTO CORPORATION

1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter:D4-3888
Counted:TO
Weather:Clear

File Name : KeaHonoAM
Site Code : 00000001
Start Date : 9/20/2007
Page No : 1

Groups Printed- Unshifted

Start Time	Honoapiilani Highway Southbound			Keawe Street Westbound			Honoapiilani Highway Northbound			Keawe Street Eastbound			Int. Total	
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
06:15 AM	8	168	3	2	2	12	9	258	18	285	1	2	5	8
06:30 AM	5	169	3	5	0	3	8	282	21	311	1	0	8	9
06:45 AM	10	244	4	4	1	11	14	257	24	295	4	2	8	14
Total	23	581	10	11	3	26	31	797	63	891	6	4	21	31
07:00 AM	8	279	7	5	0	2	14	288	16	318	3	0	12	15
07:15 AM	10	323	6	7	0	7	14	257	26	297	4	4	16	24
07:30 AM	8	341	8	9	1	8	12	321	16	349	4	4	13	21
07:45 AM	13	215	4	11	3	12	14	333	30	377	8	11	18	37
Total	39	1158	25	32	4	29	54	1199	88	1341	19	19	59	97
08:00 AM	12	247	10	11	2	9	15	266	26	307	3	5	26	34
08:15 AM	17	239	11	11	4	13	15	217	20	252	5	6	15	26
Grand Total	91	2225	56	65	13	77	115	2479	197	2791	33	34	121	188
Approch %	3.8	93.8	2.4	41.9	8.4	49.7	4.1	88.8	7.1	17.6	17.6	18.1	64.4	3.4
Total %	1.7	40.4	1	1.2	0.2	1.4	2.1	45	3.6	50.7	0.6	0.6	2.2	3.4

Start Time	Honoapiilani Highway Southbound			Keawe Street Westbound			Honoapiilani Highway Northbound			Keawe Street Eastbound			Int. Total	
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
07:00 AM	8	279	7	5	0	2	14	288	16	318	3	0	12	15
07:15 AM	10	323	6	7	0	7	14	257	26	297	4	4	16	24
07:30 AM	8	341	8	9	1	8	12	321	16	349	4	4	13	21
07:45 AM	13	215	4	11	3	12	14	333	30	377	8	11	18	37
Total Volume	39	1158	25	32	4	29	54	1199	88	1341	19	19	59	97
% App. Total	3.2	94.8	2	49.2	6.2	44.6	4	89.4	6.6	19.6	19.6	19.6	60.8	655
PHF	.750	.849	.781	.727	.333	.604	.964	.900	.733	.889	.594	.432	.819	.914

Peak Hour Analysis From 06:15 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

WILSON OKAMOTO CORPORATION
 1907 S. Beretania Street, Suite 400
 Honolulu, HI 96826

Counter:D4-3888
 Counted:TO
 Weather:Clear

File Name : KeaHonoPM
 Site Code : 00000001
 Start Date : 9/20/2007
 Page No : 1

Groups Printed- Unshifted

Start Time	Honoapiilani Highway Southbound						Keawe Street Westbound						Honoapiilani Highway Northbound						Keawe Street Eastbound						
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
03:00 PM	9	300	18	327	31	6	15	52	30	305	8	343	20	3	33	56	778								
03:15 PM	16	359	6	381	17	1	13	31	29	281	4	314	17	2	43	62	788								
03:30 PM	10	354	14	378	22	2	12	36	43	337	10	390	42	1	34	77	881								
03:45 PM	7	298	25	330	18	5	10	33	19	288	10	317	34	4	38	76	756								
Total	42	1311	63	1416	88	14	50	152	121	1211	32	1364	113	10	148	271	3203								
04:00 PM	15	396	11	422	6	5	5	16	39	418	7	464	26	1	39	66	968								
04:15 PM	6	321	4	331	20	2	6	28	30	320	9	359	27	2	41	70	788								
04:30 PM	5	331	17	353	22	5	11	38	32	318	1	351	23	2	35	60	802								
04:45 PM	8	266	17	291	12	0	13	25	40	268	2	310	22	0	28	50	676								
Total	34	1314	49	1397	60	12	35	107	141	1324	19	1484	98	5	143	246	3234								
05:00 PM	6	249	18	273	17	4	14	35	20	270	6	296	29	1	33	63	667								
05:15 PM	5	270	14	289	13	2	8	23	31	275	3	309	21	0	41	62	683								
05:30 PM	2	279	16	297	15	0	7	22	32	291	5	328	17	2	25	44	691								
05:45 PM	3	243	11	257	5	0	6	11	26	253	4	283	12	0	31	43	594								
Total	16	1041	59	1116	50	6	35	91	109	1089	18	1216	79	3	130	212	2635								
Grand Total	92	3666	171	3929	198	32	120	350	371	3624	69	4064	290	18	421	729	9072								
Approch %	2.3	93.3	4.4	43.3	56.6	9.1	34.3	3.9	9.1	89.2	1.7	44.8	39.8	2.5	57.8	8									
Total %	1	40.4	1.9	43.3	2.2	0.4	1.3	3.9	4.1	39.9	0.8	44.8	3.2	0.2	4.6	8									

Start Time	Honoapiilani Highway Southbound						Keawe Street Westbound						Honoapiilani Highway Northbound						Keawe Street Eastbound					
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	
03:15 PM	16	359	6	381	17	1	13	31	29	281	4	314	17	2	43	62	788							
03:30 PM	10	354	14	378	22	2	12	36	43	337	10	390	42	1	34	77	881							
03:45 PM	7	298	25	330	18	5	10	33	19	288	10	317	34	4	38	76	756							
Total Volume	48	1407	56	1511	63	13	40	116	130	1324	31	1485	119	8	154	281	3393							
% App. Total	3.2	93.1	3.7	43.3	54.3	11.2	34.5	3.9	8.8	89.2	2.1	44.8	42.3	2.8	54.8	8								
PHF	.750	.888	.560	.895	.716	.650	.769	.806	.756	.792	.775	.800	.708	.500	.895	.912	.876							

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 03:15 PM

WILSON OKAMOTO CORPORATION

1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter: D4-3889

Counted: ER

Weather: Clear

File Name : HonoPap AM
Site Code : 00000002
Start Date : 9/13/2007
Page No : 1

Groups Printed- Unshifted

Start Time	Honoapiilani Highway Southbound				Papalaua Street Westbound				Honoapiilani Highway Northbound				Papalaua Street Eastbound					
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
06:15 AM	1	0	12	13	0	3	2	5	10	0	0	0	10	37	0	7	44	72
06:30 AM	1	0	20	21	1	0	1	2	13	0	2	2	15	33	3	10	46	84
06:45 AM	2	0	25	27	1	1	2	4	14	0	5	5	19	40	3	4	47	97
Total	4	0	57	61	2	4	5	11	37	0	7	7	44	110	6	21	137	253
07:00 AM	4	0	19	23	2	2	6	10	21	0	6	6	27	50	4	13	67	127
07:15 AM	6	0	26	32	2	2	9	13	15	0	3	3	18	55	6	5	66	129
07:30 AM	9	0	17	26	4	4	12	20	19	0	9	9	28	64	1	8	73	147
07:45 AM	12	0	15	27	2	2	13	17	32	0	7	7	39	61	6	13	80	163
Total	31	0	77	108	10	10	40	60	87	0	25	25	112	230	17	39	286	566
08:00 AM	12	0	27	39	6	2	6	14	25	0	5	5	30	44	3	14	61	144
08:15 AM	12	0	22	34	5	6	5	16	23	0	6	6	29	44	4	18	66	145
Grand Total	59	0	183	242	23	22	56	101	172	0	43	43	215	428	30	92	550	1108
Apprch %	24.4	0	75.6	21.8	22.8	21.8	55.4	9.1	80	0	20	20	19.4	77.8	5.5	16.7	80	163
Total %	5.3	0	16.5	21.8	2.1	2	5.1	9.1	15.5	0	3.9	3.9	19.4	38.6	2.7	8.3	49.6	566

Start Time	Honoapiilani Highway Southbound				Papalaua Street Westbound				Honoapiilani Highway Northbound				Papalaua Street Eastbound					
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
Peak Hour Analysis From 06:15 AM to 08:15 AM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30 AM																		
07:30 AM	9	0	17	26	4	4	12	20	19	0	9	9	28	64	1	8	73	147
07:45 AM	12	0	15	27	2	2	13	17	32	0	7	7	39	61	6	13	80	163
08:00 AM	12	0	27	39	6	2	6	14	25	0	5	5	30	44	3	14	61	144
08:15 AM	12	0	22	34	5	6	5	16	23	0	6	6	29	44	4	18	66	145
Total Volume	45	0	81	126	17	14	36	67	99	0	27	27	126	213	14	53	280	599
% App. Total	35.7	0	64.3	80.8	25.4	20.9	53.7	83.8	78.6	0	21.4	21.4	80.8	76.1	5	18.9	87.5	919
PHF	.938	.000	.750	.808	.708	.583	.692	.838	.773	.000	.750	.750	.808	.832	.583	.736	.875	.919

WILSON OKAMOTO CORPORATION
 1907 S. Beretania Street, Suite 400
 Honolulu, HI 96826

File Name : HonoPap PM
 Site Code : 00000002
 Start Date : 9/13/2007
 Page No : 1

Counter:D4-3889
 Counted:ER
 Weather:Clear

Start Time	Groups Printed- Unshifted																
	Honoapiilani Highway Southbound				Papalaua Street Westbound				Honoapiilani Highway Northbound				Papalaua Street Eastbound				
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	11	0	19	30	4	7	14	25	20	0	2	22	69	5	26	100	177
03:15 PM	12	0	48	60	4	7	10	21	24	0	9	33	50	7	27	84	198
03:30 PM	5	0	50	55	4	11	14	29	26	0	1	27	58	6	22	86	197
03:45 PM	15	0	47	62	4	5	9	18	31	0	8	39	65	5	25	95	214
Total	43	0	164	207	16	30	47	93	101	0	20	121	242	23	100	365	786
04:00 PM	13	0	50	63	5	6	18	29	11	0	7	18	61	5	23	89	199
04:15 PM	5	0	34	39	7	9	12	28	18	0	5	23	65	6	21	92	182
04:30 PM	8	0	40	48	8	9	8	25	18	0	5	23	60	3	16	79	175
04:45 PM	11	0	66	77	6	5	13	24	8	0	6	14	42	0	23	65	180
Total	37	0	190	227	26	29	51	106	55	0	23	78	228	14	83	325	736
05:00 PM	6	0	57	63	14	3	7	24	22	0	4	26	69	6	30	105	218
05:15 PM	4	0	53	57	4	4	11	19	16	0	8	24	59	2	21	82	182
05:30 PM	5	0	67	72	4	4	3	11	15	0	3	18	53	2	17	72	173
05:45 PM	3	0	58	61	4	4	8	16	17	0	6	23	50	7	15	72	172
Total	18	0	235	253	26	15	29	70	70	0	21	91	231	17	83	331	745
Grand Total	98	0	589	687	68	74	127	269	226	0	64	290	701	54	266	1021	2267
Approach %	14.3	0	85.7	30.3	25.3	27.5	47.2	11.9	77.9	0	22.1	12.8	68.7	5.3	26.1	45	
Total %	4.3	0	26		3	3.3	5.6		10	0	2.8		30.9	2.4	11.7		

Start Time	Groups Printed- Unshifted																
	Honoapiilani Highway Southbound				Papalaua Street Westbound				Honoapiilani Highway Northbound				Papalaua Street Eastbound				
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:15 PM	12	0	48	60	4	7	10	21	24	0	9	33	50	7	27	84	198
03:30 PM	5	0	50	55	4	11	14	29	26	0	1	27	58	6	22	86	197
03:45 PM	15	0	47	62	4	5	9	18	31	0	8	39	65	5	25	95	214
04:00 PM	13	0	50	63	5	6	18	29	11	0	7	18	61	5	23	89	199
Total Volume	45	0	195	240	17	29	51	97	92	0	25	117	234	23	97	354	808
% App. Total	18.8	0	81.2	30.3	17.5	29.9	52.6	11.9	78.6	0	21.4	12.8	66.1	6.5	27.4	45	
PHF	.750	.000	.975	.952	.850	.659	.708	.836	.742	.000	.694	.750	.900	.821	.898	.932	.944

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 03:15 PM

WILSON OKAMOTO CORPORATION

1907 S. Beretania Street, Suite 400
Honolulu, HI 96826

Counter:D4-3888, D4-3891

Counted:ZW, EK

Weather:Clear

File Name : HonoLah AM
Site Code : 00000001
Start Date : 9/13/2007
Page No : 1

Groups Printed- Unshifted

Start Time	Honoapiilani Highway Southbound						Lahainaluna Road Westbound						Honoapiilani Highway Northbound						Lahainaluna Road Eastbound															
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		App. Total		Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
06:15 AM	20	110	5	135	27	27	49	103	12	176	10	198	13	45	2	60	496																	
06:30 AM	19	83	7	109	24	26	85	135	14	217	15	246	4	18	7	29	519																	
06:45 AM	62	112	10	184	21	38	90	149	15	195	28	238	17	34	1	52	623																	
Total	101	305	22	428	72	91	224	387	41	588	53	692	34	97	10	141	1638																	
07:00 AM	86	125	4	215	33	44	115	192	7	172	19	198	19	71	14	104	709																	
07:15 AM	105	214	8	327	33	53	119	205	9	202	18	229	6	64	4	74	835																	
07:30 AM	73	196	4	273	44	47	143	234	7	175	23	205	11	68	6	85	797																	
07:45 AM	41	136	3	180	33	39	114	186	9	233	11	253	8	38	6	52	671																	
Total	305	671	19	995	143	183	491	817	32	782	71	885	44	241	30	315	3012																	
08:00 AM	33	92	7	132	35	43	82	160	12	154	9	175	9	10	5	24	491																	
08:15 AM	42	146	7	195	16	25	47	88	14	171	10	195	8	33	4	45	523																	
Grand Total	481	1214	55	1750	266	342	844	1452	99	1695	143	1937	95	381	49	525	5664																	
Apprch %	27.5	69.4	3.1	30.9	18.3	23.6	58.1	25.6	5.1	87.5	7.4	34.2	18.1	72.6	9.3	34.2																		
Total %	8.5	21.4	1		4.7	6	14.9		1.7	29.9	2.5		1.7	6.7	0.9		9.3																	

Start Time	Honoapiilani Highway Southbound						Lahainaluna Road Westbound						Honoapiilani Highway Northbound						Lahainaluna Road Eastbound															
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		App. Total		Int. Total	
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total	
07:00 AM	86	125	4	215	33	44	115	192	7	172	19	198	19	71	14	104	709																	
07:15 AM	105	214	8	327	33	53	119	205	9	202	18	229	6	64	4	74	835																	
07:30 AM	73	196	4	273	44	47	143	234	7	175	23	205	11	68	6	85	797																	
07:45 AM	41	136	3	180	33	39	114	186	9	233	11	253	8	38	6	52	671																	
Total Volume	305	671	19	995	143	183	491	817	32	782	71	885	44	241	30	315	3012																	
% App. Total	30.7	67.4	1.9		17.5	22.4	60.1		3.6	88.4	8		14	76.5	9.5		.902																	
PHF	.726	.784	.594	.761	.813	.863	.858	.873	.889	.839	.772	.875	.579	.849	.536	.757																		

Peak Hour Analysis From 06:15 AM to 08:15 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

WILSON OKAMOTO CORPORATION
 1907 S. Beretania Street, Suite 400
 Honolulu, HI 96826

Counter: D4-3888, D4-3891
 Counted: ZW, EK
 Weather: Clear

File Name : HonoLah PM
 Site Code : 00000001
 Start Date : 9/13/2007
 Page No : 1

Groups Printed- Unshifted

Start Time	Honoapiilani Highway Southbound						Lahainaluna Road Westbound						Honoapiilani Highway Northbound						Lahainaluna Road Eastbound															
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		App. Total		Int. Total	
	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Int.	Total		
03:00 PM	62	180	4	246	27	39	56	122	15	190	11	216	37	41	13	91	675																	
03:15 PM	79	184	5	268	31	32	60	123	15	218	7	240	24	46	15	85	716																	
03:30 PM	36	178	7	221	24	22	69	115	17	221	9	247	15	41	7	63	646																	
03:45 PM	70	185	8	263	28	39	72	139	8	197	20	225	19	20	12	51	678																	
Total	247	727	24	998	110	132	257	489	55	826	47	928	95	148	47	290	2715																	
04:00 PM	69	112	6	187	14	35	65	114	9	225	9	243	22	38	6	66	610																	
04:15 PM	80	146	8	234	24	25	50	99	4	218	13	235	19	63	4	86	654																	
04:30 PM	68	173	5	246	22	38	70	130	18	188	17	223	13	52	2	67	666																	
04:45 PM	76	176	8	260	30	34	57	121	6	220	13	239	16	55	4	75	695																	
Total	293	607	27	927	90	132	242	464	37	851	52	940	70	208	16	294	2625																	
05:00 PM	56	137	6	199	20	31	50	101	18	223	13	254	18	40	5	63	617																	
05:15 PM	69	159	2	230	23	36	48	107	10	201	11	222	11	33	5	49	608																	
05:30 PM	34	155	2	191	14	29	50	93	13	172	13	198	19	47	7	73	555																	
05:45 PM	31	91	3	125	16	33	43	92	11	160	12	183	18	28	6	52	452																	
Total	190	542	13	745	73	129	191	393	52	756	49	857	66	148	23	237	2232																	
Grand Total	730	1876	64	2670	273	393	690	1356	144	2433	148	2725	231	504	86	821	7572																	
Approch %	27.3	70.3	2.4	35.3	20.1	29	50.9	17.9	5.3	89.3	5.4	36	28.1	61.4	10.5	10.8																		
Total %	9.6	24.8	0.8		3.6	5.2	9.1		1.9	32.1	2		3.1	6.7	1.1																			

Start Time	Honoapiilani Highway Southbound						Lahainaluna Road Westbound						Honoapiilani Highway Northbound						Lahainaluna Road Eastbound															
	Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		Left		Thru		Right		App. Total		Int. Total	
	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Left	Thru	Right	App.	Thru	Right	Int.	Total		
03:00 PM	62	180	4	246	27	39	56	122	15	190	11	216	37	41	13	91	675																	
03:15 PM	79	184	5	268	31	32	60	123	15	218	7	240	24	46	15	85	716																	
03:30 PM	36	178	7	221	24	22	69	115	17	221	9	247	15	41	7	63	646																	
03:45 PM	70	185	8	263	28	39	72	139	8	197	20	225	19	20	12	51	678																	
Total Volume	247	727	24	998	110	132	257	499	55	826	47	928	95	148	47	290	2715																	
% App. Total	24.7	72.8	2.4	99.8	22	26.5	51.5	89.7	5.9	89	5.1	93.9	32.8	51	16.2	79.7	948																	
PHF	.782	.982	.750	.931	.887	.846	.892	.897	.809	.934	.588	.939	.642	.804	.783	.797																		

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1
 Peak Hour for Entire Intersection Begins at 03:00 PM

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) for signalized intersections is defined in terms of delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average control delay per vehicle, typically a 15-min analysis period. The criteria are given in the following table.

Table 1: Level-of-Service Criteria for Signalized Intersections

Level of Service	Control Delay per Vehicle (sec/veh)
A	≤ 10.0
B	>10.0 and ≤ 20.0
C	>20.0 and ≤ 35.0
D	>35.0 and ≤ 55.0
E	>55.0 and ≤ 80.0
F	>80.0

Delay is a complex measure and depends 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.

Level of Service A describes operations with low control delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.

Level of Service B describes operations with control delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of delay.

Level of Service C describes operations with control delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from only fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. Cycle failure occurs when a given green phase does not serve queued vehicles and overflows occur. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

Level of Service D describes operations with control delay greater than 35 and up to 55 sec per vehicle. At level of service 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 operation with control delay greater than 55 and up to 80 sec per vehicle. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.

Level of Service F describes operations with control delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity lane groups. It may also occur at high v/c ratios with many individual cycle failures. Poor progression and long cycle lengths may also contribute significantly to high delay levels.

APPENDIX C

**CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK HOUR TRAFFIC ANALYSIS**

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	135	31	22	122	22	35	26	1181	40	20	1030	77
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			2			4			4			8

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		39.0				27.0	54.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	385	1333	0.49	0.29	40.7	D	40.0	D
R	457	1583	0.05	0.29	34.7	C		
Westbound								
L	290	1004	0.58	0.29	44.1	D		
TR	491	1700	0.15	0.29	35.8	D	41.6	D
Northbound								
L	391	1956	0.08	0.20	44.0	D		
TR	1561	3903	0.89	0.40	44.8	D	44.7	D
Southbound								
L	391	1956	0.06	0.20	43.8	D		
TR	1553	3883	0.85	0.40	41.9	D	42.0	D

Intersection Delay = 43.0 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	152	48	32	128	37	38	55	1163	92	42	1406	116
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			3			4			9			12

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		38.0				19.0	63.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	369	1310	0.59	0.28	44.2	D	43.1	D
R	446	1583	0.07	0.28	35.6	D		
Westbound								
L	255	906	0.70	0.28	51.9	D		
TR	487	1729	0.20	0.28	37.1	D	46.6	D
Northbound								
L	275	1956	0.21	0.14	51.7	D		
TR	1811	3881	0.71	0.47	30.0	C	31.0	C
Southbound								
L	275	1956	0.17	0.14	51.4	D		
TR	1810	3879	0.96	0.47	52.4	D	52.4	D

Intersection Delay = 43.4 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig		LT	R		LT	R	L	T	R	L	TR	
Volume	19	19	59	32	4	29	54	1199	88	39	1158	25
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			6			3			9			3

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		33.0				31.5	55.5	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS

Eastbound

LT	390	1597	0.15	0.24	40.2	D	40.6	D
R	387	1583	0.21	0.24	40.9	D		

Westbound

LT	334	1368	0.17	0.24	40.5	D	40.1	D
R	387	1583	0.11	0.24	39.7	D		

Northbound

L	456	1956	0.13	0.23	41.1	D		
T	1612	3920	0.84	0.41	39.8	D	39.0	D
R	719	1750	0.12	0.41	24.7	C		

Southbound

L	456	1956	0.10	0.23	40.7	D		
TR	1607	3909	0.85	0.41	41.1	D	41.1	D

Intersection Delay = 40.0 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig		LT	R		LT	R	L	T	R	L	TR	
Volume	119	8	154	63	13	40	130	1324	31	48	1407	56
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			15			4			3			6

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	31.0				28.0	61.0		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group Delay LOS		Approach Delay LOS	
			v/c	g/C				
Eastbound								
LT	281	1223	0.50	0.23	46.6	D	45.8	D
R	364	1583	0.42	0.23	45.1	D		
Westbound								
LT	251	1095	0.37	0.23	44.8	D	43.7	D
R	364	1583	0.12	0.23	41.4	D		
Northbound								
L	406	1956	0.40	0.21	46.9	D		
T	1771	3920	0.93	0.45	46.9	D	46.4	D
R	791	1750	0.04	0.45	20.7	C		
Southbound								
L	406	1956	0.13	0.21	43.7	D		
TR	1762	3900	0.92	0.45	44.2	D	44.2	D

Intersection Delay = 45.3 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM Peak
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig	LT R			LTR			L	TR		L	TR	
Volume	230	17	39	10	10	40	87	1138	25	31	1093	77
Lane Width	12.0		12.0	12.0			12.0	12.0		12.0	12.0	
RTOR Vol	4			4			3			8		

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A			NB Left	A		
Thru	A	A			Thru	A		
Right	A	A			Right	A		
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	25.0	12.0			25.5	57.5		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	416	1780	0.67	0.27	47.9	D	46.5	D
R	434	1583	0.09	0.27	36.6	D		
Westbound								
LTR	234	1264	0.29	0.19	48.0	D	48.0	D
Northbound								
L	369	1956	0.27	0.19	47.2	D		
TR	1665	3909	0.79	0.43	36.3	D	37.1	D
Southbound								
L	369	1956	0.11	0.19	45.5	D		
TR	1655	3885	0.92	0.43	47.5	D	47.4	D

Intersection Delay = 43.0 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig		LT	R		LTR		L	TR		L	TR	
Volume	242	23	100	16	30	47	101	1127	20	43	1266	164
Lane Width		12.0	12.0		12.0		12.0	12.0		12.0	12.0	
RTOR Vol			10			5			2			16

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	27.0	12.0			23.5	57.5		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	407	1781	0.70	0.29	48.2	D	45.3	D
R	457	1583	0.21	0.29	36.6	D		
Westbound								
LTR	242	1212	0.43	0.20	48.6	D	48.6	D
Northbound								
L	340	1956	0.31	0.17	49.2	D		
TR	1666	3911	0.73	0.43	34.0	C	35.2	D
Southbound								
L	340	1956	0.14	0.17	47.3	D		
TR	1643	3858	0.93	0.43	47.8	D	47.7	D

Intersection Delay = 42.6 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	R		L	TR		L	TR	
Volume	44	241	30	143	183	491	32	782	71	305	671	19
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			3			123			7			2

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru					Thru		A	
Right					Right		A	
Peds					Peds			
WB Left		A			SB Left	A	A	
Thru					Thru		A	A
Right					Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		5.0	44.0			17.0	19.0	40.0
Yellow		0.0	4.0			0.0	0.0	4.0
All Red		0.0	1.0			0.0	0.0	1.0

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	386	1770	0.15	0.40	25.9	C		
TR	598	1834	0.59	0.33	39.5	D	37.6	D
Westbound								
L	269	1770	0.61	0.40	43.6	D		
T	607	1863	0.35	0.33	34.9	C	46.2	D
R	516	1583	0.82	0.33	52.9	D		
Northbound								
L	246	1956	0.15	0.13	52.8	D		
TR	1148	3875	0.84	0.30	50.4	D	50.5	D
Southbound								
L	522	1956	0.77	0.27	52.8	D		
TR	1707	3906	0.53	0.44	28.2	C	35.7	D

Intersection Delay = 42.5 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Existing
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	95	148	47	110	132	257	55	826	47	247	727	24
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			5			64			5			2

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left	A		A		SB Left	A	A	
Thru			A		Thru		A	A
Right			A		Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	5.0	38.0			30.0	8.0	44.0	
Yellow	0.0	4.0			0.0	0.0	4.0	
All Red	0.0	1.0			0.0	0.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	381	1770	0.31	0.36	33.5	C		
TR	507	1801	0.47	0.28	40.8	D	38.4	D
Westbound								
L	305	1770	0.40	0.36	36.8	D		
T	524	1863	0.28	0.28	38.1	D	39.1	D
R	446	1583	0.48	0.28	41.1	D		
Northbound								
L	435	1956	0.14	0.22	42.2	D		
TR	1268	3891	0.73	0.33	42.4	D	42.4	D
Southbound								
L	551	1956	0.48	0.28	41.0	D		
TR	1503	3902	0.54	0.39	32.5	C	34.6	C

Intersection Delay = 38.5 (sec/veh) Intersection LOS = D

APPENDIX D

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2011 PEAK HOUR TRAFFIC
ANALYSIS WITHOUT PROJECT**

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	146	31	22	122	22	35	26	1575	40	20	1418	94
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			2			4			4			10

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	36.0				19.0	65.0		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	355	1332	0.55	0.27	44.4	D	43.7	D
R	422	1583	0.05	0.27	36.9	D		
Westbound								
L	253	949	0.64	0.27	49.5	D		
TR	453	1699	0.15	0.27	38.0	D	46.1	D
Northbound								
L	275	1956	0.11	0.14	50.8	D		
TR	1881	3907	0.95	0.48	48.4	D	48.4	D
Southbound								
L	275	1956	0.08	0.14	50.5	D		
TR	1872	3887	0.89	0.48	38.2	D	38.3	D

Intersection Delay = 43.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig	LT R			L TR			L TR			L TR		
Volume	222	48	32	128	37	38	55	1655	92	42	1854	197
Lane Width	12.0		12.0	12.0		12.0	12.0		12.0	12.0		12.0
RTOR Vol	3			4			9			20		

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left	A		
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru	A		
Right	A				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	38.5				7.0		74.5	
Yellow	4.0				4.0		4.0	
All Red	1.0				1.0		1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
	Capacity		v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	369	1295	0.77	0.29	54.6	D	52.7	D
R	451	1583	0.07	0.29	35.2	D		
Westbound								
L	204	717	0.84	0.29	76.2	E		
TR	493	1729	0.19	0.29	36.7	D	62.2	E
Northbound								
L	101	1956	0.54	0.05	68.6	E		
TR	2148	3892	0.81	0.55	27.0	C	28.2	C
Southbound								
L	101	1956	0.44	0.05	65.1	E		
TR	2135	3869	1.00	0.55	70.5	E	70.4	E

Intersection Delay = 52.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig		LT	R		LT	R	L	T	R	L	TR	
Volume	19	19	70	32	4	29	71	1594	88	39	1554	25
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			7			3			9			3

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	28.0				27.0	65.0		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group Delay LOS		Approach Delay LOS	
			v/c	g/C				
Eastbound								
LT	329	1588	0.18	0.21	44.3	D	45.1	D
R	328	1583	0.29	0.21	45.6	D		
Westbound								
LT	281	1354	0.20	0.21	44.6	D	44.2	D
R	328	1583	0.13	0.21	43.7	D		
Northbound								
L	391	1956	0.20	0.20	45.3	D		
T	1887	3920	0.94	0.48	45.0	D	43.8	D
R	843	1750	0.10	0.48	19.2	B		
Southbound								
L	391	1956	0.11	0.20	44.3	D		
TR	1884	3912	0.93	0.48	43.2	D	43.2	D

Intersection Delay = 43.6 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig	LT R			LT R			L	T	R	L	TR	
Volume	119	8	237	63	13	40	198	1826	31	48	1855	56
Lane Width	12.0		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol	24			4			3			6		

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	28.0				21.5	70.5		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	252	1213	0.56	0.21	50.7	D	54.8	D
R	328	1583	0.71	0.21	57.2	E		
Westbound								
LT	222	1068	0.42	0.21	47.8	D	46.5	D
R	328	1583	0.13	0.21	43.8	D		
Northbound								
L	312	1956	0.67	0.16	58.9	E		
T	2047	3920	0.94	0.52	41.3	D	42.7	D
R	914	1750	0.03	0.52	15.7	B		
Southbound								
L	312	1956	0.16	0.16	49.2	D		
TR	2039	3904	0.98	0.52	58.8	E	58.6	E

Intersection Delay = 50.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM Peak
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig		LT	R		LTR		L	TR		L	TR	
Volume	230	17	39	10	10	40	87	1546	25	31	1496	77
Lane Width		12.0	12.0		12.0		12.0	12.0		12.0	12.0	
RTOR Vol			4			4			3			8

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	24.0	11.0			21.5	63.5		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	393	1780	0.71	0.26	51.6	D	49.9	D
R	410	1583	0.10	0.26	38.1	D		
Westbound								
LTR	210	1184	0.32	0.18	49.3	D	49.3	D
Northbound								
L	312	1956	0.31	0.16	50.8	D		
TR	1840	3912	0.95	0.47	48.1	D	48.2	D
Southbound								
L	312	1956	0.11	0.16	48.7	D		
TR	1832	3894	0.95	0.47	48.8	D	48.8	D

Intersection Delay = 48.6 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig	LT R			LTR			L	TR		L	TR	
Volume	242	23	100	16	30	47	101	1684	20	43	1788	164
Lane Width	12.0		12.0	12.0			12.0	12.0		12.0	12.0	
RTOR Vol	10			5			2			16		

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	23.0	11.0			14.0	72.0		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	353	1781	0.81	0.25	61.8	E	56.4	E
R	399	1583	0.24	0.25	40.6	D		
Westbound								
LTR	159	932	0.66	0.17	62.5	E	62.5	E
Northbound								
L	203	1956	0.52	0.10	59.8	E		
TR	2087	3914	0.86	0.53	31.1	C	32.7	C
Southbound								
L	203	1956	0.22	0.10	56.1	E		
TR	2067	3875	0.99	0.53	59.3	E	59.2	E

Intersection Delay = 47.8 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	44	241	30	143	183	504	32	1154	71	305	1022	43
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			3			126			7			4

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left	A				SB Left	A	A	
Thru		A			Thru		A	A
Right		A			Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	5.0	42.0			9.0	20.0	49.0	
Yellow	0.0	4.0			0.0	0.0	4.0	
All Red	0.0	1.0			0.0	0.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c g/C		Lane Group Delay LOS		Approach Delay LOS	
Eastbound								
L	366	1770	0.16	0.39	27.2	C		
TR	571	1834	0.62	0.31	41.7	D	39.7	D
Westbound								
L	251	1770	0.65	0.39	47.8	D		
T	580	1863	0.36	0.31	36.5	D	53.9	D
R	492	1583	0.88	0.31	64.5	E		
Northbound								
L	130	1956	0.28	0.07	61.1	E		
TR	1412	3889	0.96	0.36	63.3	E	63.2	E
Southbound								
L	420	1956	0.81	0.21	62.5	E		
TR	1993	3899	0.59	0.51	23.6	C	32.3	C

Intersection Delay = 47.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/out proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	95	148	47	110	132	285	55	1336	47	247	1192	45
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			5			71			5			5

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A	A		SB Left	A	A	
Thru			A		Thru		A	A
Right			A		Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		5.0	33.5			24.0	7.5	55.0
Yellow		0.0	4.0			0.0	0.0	4.0
All Red		0.0	1.0			0.0	0.0	1.0

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	336	1770	0.35	0.32	37.4	D		
TR	447	1801	0.53	0.25	45.1	D	42.6	D
Westbound								
L	261	1770	0.47	0.32	41.5	D		
T	462	1863	0.32	0.25	41.8	D	44.4	D
R	393	1583	0.61	0.25	47.6	D		
Northbound								
L	348	1956	0.17	0.18	47.3	D		
TR	1590	3902	0.91	0.41	47.3	D	47.3	D
Southbound								
L	456	1956	0.57	0.23	47.5	D		
TR	1806	3901	0.72	0.46	30.6	C	33.4	C

Intersection Delay = 41.0 (sec/veh) Intersection LOS = D

APPENDIX E

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2011 PEAK HOUR TRAFFIC
ANALYSIS WITH PROJECT**

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	146	31	22	122	22	35	26	1603	40	20	1426	94
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			2			4			4			10

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		36.0				18.0	66.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group Delay LOS		Approach Delay LOS	
			v/c	g/C				
Eastbound								
LT	354	1327	0.55	0.27	44.5	D	43.7	D
R	422	1583	0.05	0.27	36.9	D		
Westbound								
L	253	949	0.67	0.27	51.0	D		
TR	453	1700	0.16	0.27	38.1	D	47.1	D
Northbound								
L	261	1956	0.11	0.13	51.7	D		
TR	1910	3907	0.95	0.49	48.2	D	48.2	D
Southbound								
L	261	1956	0.08	0.13	51.4	D		
TR	1900	3887	0.88	0.49	36.7	D	36.9	D

Intersection Delay = 43.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	222	48	32	128	37	38	55	1668	92	42	1877	197
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			3			4			9			20

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		38.5				6.5	75.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	369	1295	0.77	0.29	54.6	D	52.7	D
R	451	1583	0.07	0.29	35.2	D		
Westbound								
L	204	717	0.84	0.29	76.2	E		
TR	493	1729	0.19	0.29	36.7	D	62.2	E
Northbound								
L	94	1956	0.59	0.05	72.3	E		
TR	2162	3892	0.81	0.56	26.7	C	28.1	C
Southbound								
L	94	1956	0.47	0.05	66.3	E		
TR	2149	3869	1.01	0.56	74.8	E	74.6	E

Intersection Delay = 54.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig		LT	R		LT	R	L	T	R	L	TR	
Volume	19	19	70	47	4	46	71	1605	93	44	1557	25
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			7			5			9			3

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		28.0				27.0	65.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	326	1570	0.18	0.21	44.3	D	45.1	D
R	328	1583	0.29	0.21	45.6	D		
Westbound								
LT	270	1304	0.30	0.21	45.8	D	45.3	D
R	328	1583	0.20	0.21	44.5	D		
Northbound								
L	391	1956	0.20	0.20	45.3	D		
T	1887	3920	0.94	0.48	46.5	D	45.1	D
R	843	1750	0.11	0.48	19.2	B		
Southbound								
L	391	1956	0.13	0.20	44.5	D		
TR	1884	3912	0.93	0.48	43.5	D	43.5	D

Intersection Delay = 44.4 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	1	1	2	1	1	2	0
LGConfig		LT	R		LT	R	L	T	R	L	TR	
Volume	119	8	237	74	13	50	198	1829	47	66	1860	56
Lane Width		12.0	12.0		12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			24			4			3			6

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		27.5				21.5	71.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	235	1156	0.60	0.20	52.9	D	56.5	E
R	322	1583	0.73	0.20	58.6	E		
Westbound								
LT	215	1054	0.50	0.20	49.5	D	47.8	D
R	322	1583	0.18	0.20	44.7	D		
Northbound								
L	312	1956	0.67	0.16	58.9	E		
T	2062	3920	0.93	0.53	39.9	D	41.2	D
R	920	1750	0.05	0.53	15.6	B		
Southbound								
L	312	1956	0.22	0.16	49.8	D		
TR	2054	3905	0.98	0.53	55.4	E	55.2	E

Intersection Delay = 48.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM Peak
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig	LT R			LTR			L TR			L TR		
Volume	230	17	39	10	10	40	87	1562	25	31	1514	77
Lane Width	12.0 12.0			12.0			12.0 12.0			12.0 12.0		
RTOR Vol	4			4			3			8		

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		24.0	11.0			21.0	64.0	
Yellow		0.0	4.0			4.0	4.0	
All Red		0.0	1.0			1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	393	1780	0.71	0.26	51.6	D	49.9	D
R	410	1583	0.10	0.26	38.1	D		
Westbound								
LTR	210	1184	0.32	0.18	49.3	D	49.3	D
Northbound								
L	304	1956	0.32	0.16	51.3	D		
TR	1855	3912	0.95	0.47	48.3	D	48.4	D
Southbound								
L	304	1956	0.11	0.16	49.1	D		
TR	1846	3894	0.95	0.47	49.5	D	49.5	D

Intersection Delay = 49.0 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig		LT	R		LTR		L	TR		L	TR	
Volume	242	23	100	16	30	47	101	1703	20	43	1804	164
Lane Width		12.0	12.0		12.0		12.0	12.0		12.0	12.0	
RTOR Vol			10			5			2			16

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru	A	A			Thru		A	
Right	A	A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	23.0	11.0			13.5	72.5		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	353	1781	0.81	0.25	61.8	E	56.4	E
R	399	1583	0.24	0.25	40.6	D		
Westbound								
LTR	159	932	0.66	0.17	62.5	E	62.5	E
Northbound								
L	196	1956	0.54	0.10	60.9	E		
TR	2102	3914	0.86	0.54	31.1	C	32.7	C
Southbound								
L	196	1956	0.23	0.10	56.6	E		
TR	2081	3875	0.99	0.54	60.0	E	59.9	E

Intersection Delay = 48.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	44	241	30	154	183	515	32	1159	75	308	1067	43
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			3			129			8			4

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru			A		Thru		A	
Right			A		Right		A	
Peds					Peds			
WB Left		A			SB Left	A	A	
Thru			A		Thru		A	A
Right			A		Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		5.0	42.5			6.5	22.0	49.0
Yellow		0.0	4.0			0.0	0.0	4.0
All Red		0.0	1.0			0.0	0.0	1.0

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	371	1770	0.16	0.39	26.8	C		
TR	577	1834	0.61	0.31	41.2	D	39.2	D
Westbound								
L	255	1770	0.69	0.39	50.7	D		
T	586	1863	0.36	0.31	36.1	D	55.3	E
R	498	1583	0.89	0.31	66.2	E		
Northbound								
L	94	1956	0.38	0.05	64.9	E		
TR	1411	3888	0.97	0.36	66.3	E	66.3	E
Southbound								
L	413	1956	0.83	0.21	65.6	E		
TR	2051	3899	0.60	0.53	22.6	C	32.0	C

Intersection Delay = 48.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID:
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	95	148	47	113	132	288	55	1352	52	252	1203	45
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			5			72			5			5

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left	A	A			SB Left	A	A	
Thru		A			Thru		A	A
Right		A			Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	5.0	33.5			23.5	7.5	55.5	
Yellow	0.0	4.0			0.0	0.0	4.0	
All Red	0.0	1.0			0.0	0.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	336	1770	0.35	0.32	37.4	D		
TR	447	1801	0.53	0.25	45.1	D	42.6	D
Westbound								
L	261	1770	0.48	0.32	42.0	D		
T	462	1863	0.32	0.25	41.8	D	44.6	D
R	393	1583	0.61	0.25	47.8	D		
Northbound								
L	340	1956	0.17	0.17	47.7	D		
TR	1603	3900	0.92	0.41	47.9	D	47.9	D
Southbound								
L	449	1956	0.59	0.23	48.4	D		
TR	1820	3901	0.72	0.47	30.3	C	33.4	C

Intersection Delay = 41.2 (sec/veh) Intersection LOS = D

APPENDIX F

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2011 PEAK HOUR TRAFFIC ANALYSIS
WITH PROJECT AND KEAWE STREET EXTENSION**

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID: With Keawe St Ext
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	146	31	22	122	22	35	26	1603	40	20	1426	94
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			2			4			4			10

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	36.0				18.0	66.0		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	354	1327	0.55	0.27	44.5	D	43.7	D
R	422	1583	0.05	0.27	36.9	D		
Westbound								
L	253	949	0.67	0.27	51.0	D		
TR	453	1700	0.16	0.27	38.1	D	47.1	D
Northbound								
L	261	1956	0.11	0.13	51.7	D		
TR	1910	3907	0.95	0.49	48.2	D	48.2	D
Southbound								
L	261	1956	0.08	0.13	51.4	D		
TR	1900	3887	0.88	0.49	36.7	D	36.9	D

Intersection Delay = 43.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID: With Keawe St Ext
 E/W St: Kapunakea Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	0	1	2	0	1	2	0
LGConfig		LT	R	L	TR		L	TR		L	TR	
Volume	222	48	32	128	37	38	55	1668	92	42	1877	197
Lane Width		12.0	12.0	12.0	12.0		12.0	12.0		12.0	12.0	
RTOR Vol			3			4			9			20

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		38.5				6.5	75.0	
Yellow		4.0				4.0	4.0	
All Red		1.0				1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	369	1295	0.77	0.29	54.6	D	52.7	D
R	451	1583	0.07	0.29	35.2	D		
Westbound								
L	204	717	0.84	0.29	76.2	E		
TR	493	1729	0.19	0.29	36.7	D	62.2	E
Northbound								
L	94	1956	0.59	0.05	72.3	E		
TR	2162	3892	0.81	0.56	26.7	C	28.1	C
Southbound								
L	94	1956	0.47	0.05	66.3	E		
TR	2149	3869	1.01	0.56	74.8	E	74.6	E

Intersection Delay = 54.1 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID: With Keawe St Ext
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	1	1	2	1	1	2	0
LGConfig		LT	R	L	T	R	L	T	R	L	TR	
Volume	19	19	70	107	4	237	71	1414	93	160	1441	25
Lane Width		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			7			24			9			3

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A				NB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	34.5				26.0	59.5		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	419	1638	0.14	0.26	38.9	D	39.7	D
R	405	1583	0.23	0.26	40.1	D		
Westbound								
L	342	1340	0.42	0.26	42.7	D		
T	476	1863	0.01	0.26	37.5	D	48.2	D
R	405	1583	0.70	0.26	51.1	D		
Northbound								
L	377	1956	0.21	0.19	46.1	D		
T	1728	3920	0.91	0.44	43.7	D	42.7	D
R	771	1750	0.12	0.44	22.4	C		
Southbound								
L	377	1956	0.47	0.19	49.3	D		
TR	1724	3911	0.94	0.44	49.9	D	49.8	D

Intersection Delay = 46.3 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID: With Keawe St Ext
 E/W St: Keawe Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	1	1	1	1	2	1	1	2	0
LGConfig		LT	R	L	T	R	L	T	R	L	TR	
Volume	119	8	237	113	13	124	198	1755	47	180	1746	56
Lane Width		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	
RTOR Vol			24			12			5			6

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	29.0				23.5	67.5		
Yellow	4.0				4.0	4.0		
All Red	1.0				1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	291	1356	0.48	0.21	47.7	D	52.1	D
R	340	1583	0.69	0.21	54.8	D		
Westbound								
L	231	1075	0.61	0.21	52.4	D		
T	400	1863	0.04	0.21	42.0	D	49.0	D
R	340	1583	0.41	0.21	46.4	D		
Northbound								
L	340	1956	0.61	0.17	54.8	D		
T	1960	3920	0.94	0.50	44.1	D	44.6	D
R	875	1750	0.05	0.50	17.3	B		
Southbound								
L	340	1956	0.56	0.17	53.0	D		
TR	1952	3904	0.97	0.50	52.8	D	52.8	D

Intersection Delay = 49.0 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM Peak
 Project ID: With Keawe St Ext
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig		LT	R		LTR		L	TR		L	TR	
Volume	230	17	39	10	10	40	87	1371	25	31	1458	77
Lane Width		12.0	12.0		12.0		12.0	12.0		12.0	12.0	
RTOR Vol			4			4			3			8

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	A	A			NB Left	A		
Thru	A	A			Thru		A	
Right	A	A			Right		A	
Peds					Peds			
WB Left	A				SB Left	A		
Thru	A				Thru		A	
Right	A				Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	24.0	12.0			22.0	62.0		
Yellow	0.0	4.0			4.0	4.0		
All Red	0.0	1.0			1.0	1.0		

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	406	1780	0.69	0.27	49.5	D	48.0	D
R	422	1583	0.09	0.27	37.3	D		
Westbound								
LTR	213	1198	0.31	0.18	49.2	D	49.2	D
Northbound								
L	319	1956	0.30	0.16	50.3	D		
TR	1796	3911	0.86	0.46	37.4	D	38.2	D
Southbound								
L	319	1956	0.11	0.16	48.3	D		
TR	1788	3893	0.95	0.46	49.9	D	49.8	D

Intersection Delay = 44.6 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID: With Keawe St Ext
 E/W St: Papalaua Street

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Hwy

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	1	0	1	0	1	2	0	1	2	0
LGConfig	LT R			LTR			L TR			L TR		
Volume	242	23	100	16	30	47	101	1629	20	43	1729	164
Lane Width	12.0 12.0			12.0			12.0 12.0			12.0 12.0		
RTOR Vol	10			5			2			16		

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		23.5	11.5			15.0	70.0	
Yellow		0.0	4.0			4.0	4.0	
All Red		0.0	1.0			1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
LT	365	1781	0.78	0.26	57.7	E	53.1	D
R	410	1583	0.24	0.26	39.8	D		
Westbound								
LTR	170	978	0.62	0.17	58.4	E	58.4	E
Northbound								
L	217	1956	0.49	0.11	58.1	E		
TR	2029	3914	0.85	0.52	32.1	C	33.6	C
Southbound								
L	217	1956	0.21	0.11	55.1	E		
TR	2009	3874	0.98	0.52	59.2	E	59.1	E

Intersection Delay = 47.7 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: AM PEAK
 Project ID: With Keawe St Ext
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	44	241	30	94	183	324	32	1159	75	192	1097	43
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			3			81			8			4

Duration 1.00 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru		A			Thru		A	
Right		A			Right		A	
Peds					Peds			
WB Left	A				SB Left	A	A	
Thru		A			Thru		A	A
Right		A			Right		A	A
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		5.0	38.0			22.0	7.5	52.5
Yellow		0.0	4.0			0.0	0.0	4.0
All Red		0.0	1.0			0.0	0.0	1.0

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	327	1770	0.18	0.36	29.9	C		
TR	516	1834	0.68	0.28	47.0	D	44.6	D
Westbound								
L	213	1770	0.51	0.36	40.7	D		
T	524	1863	0.40	0.28	39.8	D	42.4	D
R	446	1583	0.63	0.28	45.1	D		
Northbound								
L	319	1956	0.11	0.16	48.3	D		
TR	1512	3888	0.90	0.39	47.5	D	47.5	D
Southbound								
L	427	1956	0.50	0.22	47.2	D		
TR	1733	3900	0.73	0.44	32.4	C	34.5	C

Intersection Delay = 41.5 (sec/veh) Intersection LOS = D

HCS+: Signalized Intersections Release 5.21

Analyst: CL
 Agency:
 Date: 10/9/07
 Period: PM PEAK
 Project ID: With Keawe St Ext
 E/W St: Lahainaluna Road

Inter.:
 Area Type: All other areas
 Jurisd:
 Year : Year 2011 w/ proj
 N/S St: Honoapiilani Highway

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	1	1	2	0	1	2	0
LGConfig	L	TR		L	T	R	L	TR		L	TR	
Volume	95	148	47	74	132	214	55	1352	52	138	1242	45
Lane Width	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
RTOR Vol			5			54			5			5

Duration 1.00 Area Type: All other areas
 Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left		A			NB Left	A		
Thru			A		Thru		A	
Right			A		Right		A	
Peds					Peds			
WB Left		A			SB Left	A		
Thru			A		Thru		A	
Right			A		Right		A	
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green		5.0	32.0			27.0	56.0	
Yellow		0.0	4.0			4.0	4.0	
All Red		0.0	1.0			1.0	1.0	

Cycle Length: 135.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios		Lane Group		Approach	
			v/c	g/C	Delay	LOS	Delay	LOS
Eastbound								
L	321	1770	0.37	0.31	38.8	D		
TR	427	1801	0.56	0.24	46.9	D	44.2	D
Westbound								
L	246	1770	0.33	0.31	35.4	D		
T	442	1863	0.33	0.24	43.1	D	42.5	D
R	375	1583	0.47	0.24	45.2	D		
Northbound								
L	391	1956	0.15	0.20	44.7	D		
TR	1618	3900	0.91	0.41	46.3	D	46.2	D
Southbound								
L	391	1956	0.37	0.20	47.3	D		
TR	1619	3902	0.83	0.41	39.4	D	40.1	D

Intersection Delay = 43.2 (sec/veh) Intersection LOS = D