CARLSMITH BALL LLP

STEVEN S. C. LIM 2505
JENNIFER A. BENCK 8357
121 Waianuenue Avenue
Hilo, Hawaii 96720
Tel No. 808.935.6644
Fax No. 808.935.7975

Attorneys for Petitioner
U of N BENCORP,
now known as AEKO HAWAII

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of U of N BENCORP To Amend the Agricultural Land Use District to the Urban Land Use District for Approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island County and State of Hawaii.	DOCKET NO. A02-737 U OF N BENCORP'S LIST OF EXHIBITS; EXHIBITS "1" TO "7"; CERTIFICATE OF SERVICE

U OF N BENCORP'S LIST OF EXHIBITS

Comes now the Petitioner herein, AEKO HAWAII (hereinafter "AEKO"), a Hawaii non-profit corporation, formerly known as U of N BENCORP, by and through its attorneys, CARLSMITH BALL, LLP and hereby submits the following List of Exhibits regarding AEKO's Motion to Amend Findings of Fact, Conclusions of Law and Decision and Order in Docket No. A02-737 and AEKO's Motion to Amend Petitioner's Name and Amend Caption.

AEKO reserves the right to amend its List of Exhibits and identify any additional exhibits not expressly identified above in response to any pleadings, arguments, exhibits, issues and witnesses identified by any party.

DATED: Honolulu, Hawaii, February 26, 2007.

STEVEN S.C. LIM
JENNIFER A. BENCK
Attorney for Petitioner
U of N BENCORP, now known as AEKO HAWAII

DOCKET NO./PETITIONER: A02-737/U OF N BENCORP, NOW KNOWN AS AEKO HAWAII

PARTY: U OF N BENCORP, NOW KNOWN AS AEKO HAWAII

LIST OF EXHIBITS

EXHIBIT NUMBER	DESCRIPTION	PARTY: OBJECTIONS	ADMIT
1	Petitioner's revised master plan for the University of the Nations' Kona campus		
2	Aerial photograph of petition area		
3	Aeko Hawaii's Financial Statement as of December 31, 2006		
4	Pacific Business News article dated September 7, 2006 regarding median prices for existing single family homes in Kailua-Kona		
5	Traffic Impact Analysis Report for the University of the Nations Master Plan dated December, 2006		
6	[Proposed] First Amended Findings of Fact, Conclusions of Law, and Decision and Order		
7	Articles of Amendment to Change Corporate Name		

CAMPUS MASTER PLAN

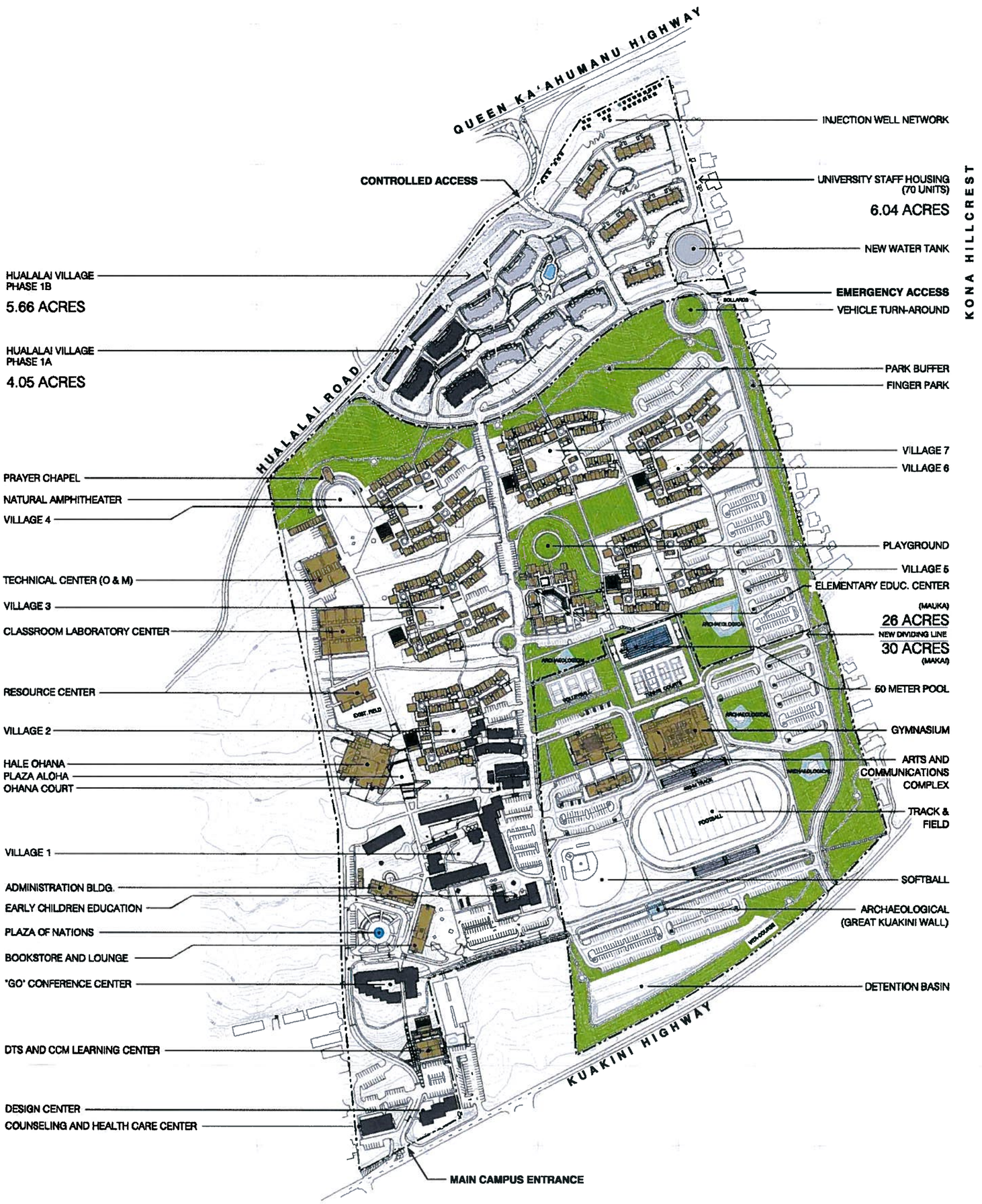


EXHIBIT 1

EXHIBIT 2

Aeko Hawaii
Balance Sheet
As of December 31, 2006

	Dec 31, 06
ASSETS	
Current Assets	
Checking/Savings	
CPB checking account	30,119.30
Total Checking/Savings	30,119.30
Total Current Assets	30,119.30
Other Assets	
Work In Progress	
Archaeology	35,000.00
Architect	207,957.29
Bencorp	776,203.13
Bonds	120,104.00
Civil Engineering	145,473.47
Construction	276,335.18
Design/Decor	33,036.61
Finanacing	56,338.31
Indirect Construction	60,298.62
Insurance	116,991.89
Interest	274,882.35
Land	1,486,088.39
Legal	55,317.20
Loan Fees	127,559.32
Marketing	126,537.80
Planning	15,010.48
Property Taxes	41,413.54
Sales Costs	65,287.91
Sitework	-89,921.61
Structural Engineer	35,592.94
Supervision	367.04
Utilities	2,090.09
Vertical Construction	6,102,979.99
Total Work In Progress	10,070,943.94
Total Other Assets	10,070,943.94
TOTAL ASSETS	**10,101,063.24**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
Accounts Payable	1,636.89
Total Accounts Payable	1,636.89
Total Current Liabilities	1,636.89

EXHIBIT 3

Aeko Hawaii
Balance Sheet
As of December 31, 2006

	Dec 31, 06
Long Term Liabilities	
Central Pac Bank-Bridge loan	4,611,176.65
Payable-BBC	1,384,892.62
Payable-Warren	15,669,790.84
Total Long Term Liabilities	21,665,860.11
Total Liabilities	21,667,497.00
Equity	
Retained Earnings	-11,562,527.71
Net Income	-3,906.05
Total Equity	-11,566,433.76
TOTAL LIABILITIES & EQUITY	**10,101,063.24**

Pacific Business News (Honolulu) - September 8, 2006
http://pacific.bizjournals.com/pacific/stories/2006/09/04/daily47.html

PACIFIC BUSINESS NEWS

Big Island median home price: $370K

Pacific Business News (Honolulu) - September 7, 2006

The median price of an existing single family home on the Big Island was $370,000 in August, **Hawaii Information Service** reported Thursday.

There were 169 homes sold, compared to 256 in the same month last year. More than half of them were either in South Hilo district, encompassing the town of Hilo, where 37 homes sold for a media price of $340,000, or in Puna, farther down the road, where 50 sold for a median price of $257,500.

A second cluster came in North Kona district, encompassing the town of Kailua-Kona, where 42 homes sold for a median price of $611,500, or in South Kohala, farther up the road, where 11 homes sold for a median price of $529,000. There were also 19 homes sales in Kau district, on the southeast end of the island, for a median price of $295,000.

There were 52 condos sold, compared to 80 in the same month last year. The median price was [illegible]01,450. The condo median price on the Big Island has exceeded the median price for a single family home for some time, driven by luxury condo developments in South Kohala district, where 24 condos went to closing last month for a median price of $1 million, and in North Kona district, where 22 condos sold last month for a median price of $407,250.

There were 145 vacant lots sold in August, but was that a fraction of the 597 that sold a year ago. A rush to buy lots in Puna district has lost steam -- 88 lots sold last month compared to 377 in August 2005. The same thing happened in Kau district, which saw 124 lots sell in August 2005 but only 24 last month.

Contact the Editor | Need Assistance? | More Latest News →

EXHIBIT 4

Traffic Impact Analysis Report
University of the Nations Master Plan

Kailua-Kona, Hawai'i

Tax Map Key Number (3)7-5-010:003 & 085, (3)7-5-017:006

DECEMBER 2006

Prepared for:
Group 70 International
925 Bethel Street, 5th Floor
Honolulu, Hawai'i 96813

Prepared by:

M&E Pacific, Inc.

METCALF & EDDY | AECOM

100 Pauahi Street, Suite 207
Hilo, Hawai'i 96720

EXHIBIT 5

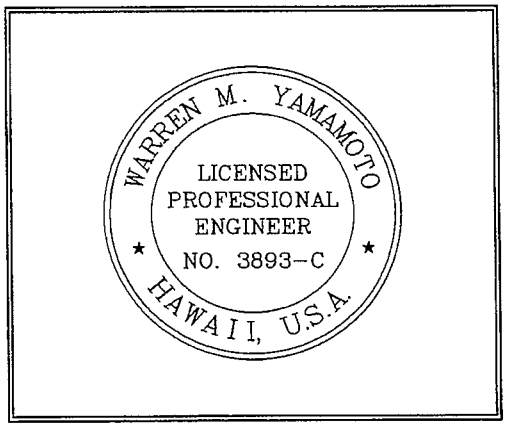
UNIVERSITY OF THE NATIONS

Kailua-Kona, Hawai'i

Traffic Impact Analysis Report

TMK: (3)7-5-010:003 & 085, (3)7-5-017:006

December 2006



Expiration Date:
April 30, 2008

This work was prepared by me or under my direct supervision.

Signature
M & E Pacific, Inc.
METCALF & EDDY | AECOM

December 21, 2006
Date

Table of Contents

List of Figures

List of Tables

TRAFFIC IMPACT ANALYSIS REPORT
for the
UNIVERSITY of the NATIONS MASTER PLAN

A new master plan has been prepared for the University of the Nations in Kailua-Kona, Hawai'i. This report documents a study that was conducted to identify the traffic impacts of the proposed project and to recommend any mitigating measures. This report describes the proposed project, the study methodology, results of the analysis, forecast of traffic impacts, and recommendations for mitigating measures. This report updates the original report prepared in 2005 due to the change in the University's benefit corporation.

PROJECT DESCRIPTION

The University of the Nations (U of N-Kona) is a Christian, non-accredited institution granting Associate's, Bachelor's, and Master's degrees. There are currently about 400 students and 300 staff members each quarter. As part of the education experience, the great majority of students live in the dormitory village on campus with about one-fourth of the staff. Many of the remaining staff reside in apartments within walking distance of the campus. The University of the Nations is designed as a walking campus and only about 5% of the students have private vehicles.

The University has a current master plan for its original 41 acre site. The campus site is on tax map key parcel TMK (3)7-5-010:003, and is situated between Hualalai Road and Kuakini Highway. The primary access to this campus is through a roadway onto Kuakini Highway about 3,600 feet south of the Kuakini Highway/Hualalai Road intersection. There is no access to Hualalai Road. The location of the campus in relationship to the Kailua-Kona roadway system is shown on **Figure 1**.

The current master plan includes the following major facilities:

- Conference Center
- Counseling and Health Care Center
- Design Center
- Early Children Education Center – A learning laboratory for teachers whose pupils are primarily the children of staff.
- Ohana Court
- Hale Ohana (dining facility)
- Administration Building
- Village 1
- Villages 2, 3, and 4 - Each village unit would have 48 student units that could accommodate 232 students, 40 staff units and classrooms. The staff units could house one or two staff members, since both spouses living in a campus unit must work on campus.
- Resource Center
- Classroom Laboratory Center

The first seven facilities, Village 1, and approximately half of Village 2 have been developed to date. The balance of Village 2 is anticipated to be ready for occupancy in the spring of 2008. There is no definite development schedule for the balance of the current master plan since major improvements are made only as donations are received and funds become available. It is virtually impossible to forecast growth of any educational institution that is directly dependent upon demand. The uncertainty is even more severe for a Christian institution. The addition of new facilities is totally dependent upon philanthropy and the generosity of friends. To illustrate the above point, it was predicted in 1980 that the University of the Nations campus would be totally built out in about twenty years, by the year 2000. Now in the year 2006, the original campus master plan is close to one-half built out.

In 2000, the University of the Nations purchased the 68-acre agricultural property directly south of the campus from Mr. Gomes. Working through a benefit corporation

(Bencorp), extensive plans were prepared for development of the land, ostensibly to benefit the University financially. Early in the spring of 2004, the top administration of the University of the Nations decided to change direction in the planning for development of the former Gomes property. They decided it was a mistake to develop the land for primarily commercial purposes, including 400 condominium units (the Hualalai Village) and the Pacific Island Cultural Center. At that time, the Bencorp board renamed the benefit corporation "AEKO HAWAII", appointed new members, and all of the former Bencorp board members resigned.

A new master plan has been developed that incorporates the former Gomes property into the original campus master plan. The expanded campus site is on tax map key parcels TMK (3)7-5-010:085 and (3)7-5-017:006. The proposed master plan for the expanded campus is shown on **Figure 2**.

The new direction would complete only the first 103 units of Hualalai Village at the mauka end of the property. These units received separate zoning approval and are currently under construction. The first half of the project has been completed and is occupied. Access to the Hualalai Village is via a single roadway connecting to Hualalai Road about 1,100 feet northwest of the Queen Kaahumanu Highway Extension intersection. The project access point is shown in relation to the Kailua roadway system on **Figure 1**.

The remainder of the land would be preserved for the future growth of the University campus. The following facilities would be added on the remaining 62 acres:

- Student Village Apartments - Three Villages (5, 6, and 7) with the same design concept as the earlier Villages, which will provide approximately 250 - 300 central units.
- Low-cost Staff Housing Community - Eventually up to 100 family units would be available for staff to purchase, including studios, one-bedroom, two-bedroom, and three-bedroom condominiums. These would be similar to the Hualalai Village housing in character but would be much less in cost. They would be constructed as the need demands, slowly, over several years. The intended

market would be the more senior staff who have "settled down." These units would be located adjacent to the Hualalai Village with vehicular access around the edge of the Village.

- Single Family Homes – Up to six single family homes are planned to be available for purchase by U of N-Kona leaders.
- College of Arts and Communications – To include a performance theater to seat 800 - 1,000 people, plus a stage, studios and offices.
- College of Education – To include a Model Education Center with a teaching laboratory, library, science room, shop room, and administrative offices, as well as playground areas and green courtyards. Most of the students in the Model Education Center will be children of U of N-Kona staff, with a limited number of students from the community.
- Soccer, football, and softball fields, track, bleachers, tennis courts, volleyball courts, a walking or running "vita course" with exercise stations around the campus, and an Olympic swimming pool with showers and lockers.
- Commons Area with the Multi-Purpose Gymnasium – To include two courts, a stage, backstage, seating for approximately 1,200, classrooms, offices, lockers, restrooms, and lobbies. This facility would be open to the community for special events.

Vehicular access and parking for these proposed land uses would be via a mauka-makai service roadway on the south boundary of the property. The makai terminal of the roadway would intersect with Kuakini Highway about one-quarter mile south of the current University driveway. The mauka portion of the roadway would include one emergency access point, one controlled access point, and the main mauka entrance to the property, located near Phase 1A of the Hualalai Village.

The emergency access point would be between Hualalai Village and the Kona Hillcrest subdivision, which does not have mauka access to Hualalai Road. It would normally be closed and opened only during emergencies. When opened, Kona Hillcrest subdivision residents would have a direct route to Hualalai Road. The controlled access point

would intersect Hualalai Road near the Queen Kaahumanu Highway Extension intersection with a right turn in, right turn out design as approved by the State of Hawai'i Department of Transportation (State DOT) staff. The main mauka entrance to the property would allow the University students and staff residing on campus to access the mauka-makai service roadway and Kuakini Highway, but will not allow campus staff/students access to Hualalai Road. The roadway would be opened in times of emergency so that the general public on Kuakini Highway could have a secondary evacuation route. This roadway access is expected to be available by 2010.

Throughout this campus expansion, the University intends to maintain its design as a walking campus. The pedestrian oriented campus will be designed so that it would be possible to go anywhere on the campus without having to use an automobile, although vehicular circulation would be available throughout the campus.

A previous paragraph discussed the difficulty with preparing development schedules for the University. For the purposes of this study, a tentative schedule identifying the starting dates of various facilities based upon assumptions and best guesses available is shown below:

Tentative Schedule of Starting Dates

- ----- Completion of Village 2 – 2008
- 2007 – Soccer, football & softball fields, track, bleachers, and volleyball courts
- 2007 – Village 4
- 2008 – Village 3
- 2008 – Staff Housing Community
- 2008 – Construction of mauka-makai service road
- 2008 – College of Education
- 2008 – Tennis courts and walking course
- 2008 – Olympic pool
- 2010 – Village 5
- 2010 – Multi-Purpose Gymnasium
- 2014 – Village 6
- 2014 – College of Arts and Communications
- 2015 – Village 7

The number of staff units available in the Student Villages and Staff Housing Community (excluding the six single family homes) based on the tentative schedule is summarized below. Based on the 2004 staff level of 250, of which about 75 lived in the Villages, there were about 175 staff members who did not live in the Villages. This assumes that there are 1.5 staff members per staff unit. To determine the future number of commuting and non-commuting staff, it is assumed that the total number of staff would increase by 40 each time a Village opened, and by 20 per year in those years Villages were not initially opened.

YEAR	VILLAGE	STAFF UNITS WITHIN VILLAGES – CUMULATIVE UNITS	STAFF HOUSING COMMUNITY - CUMULATIVE UNITS	TOTAL CUMULATIVE STAFF UNITS
2004	One	50	---	50
2008	Two	90	---	90
2009	Four	130	0	130
2010	Three	170	50	220
2012	Five	210	75	285
2015	Six	250	100	350
2016	Seven	290	100	390

Based on the proposed development schedule and the above assumptions, the cumulative student and staff (by Village, Staff Housing Community, and non-resident) populations are summarized below:

		STAFFING POPULATION			
YEAR	STUDENTS	VILLAGE	STAFF HOUSING	NON-RESIDENT	TOTAL
2004	300	75	0	175	250
2008	502	135	0	165	300
2009	562	195	0	175	370
2010	629	255	75	100	430
2012	788	315	110	65	490
2015	1,108	375	150	25	550
2016	1,241	435	150	25	610

The development schedule assumes that University student and staff population will peak in 2016. The number of non-resident staff is forecast to remain steady to 2008, and then begin decreasing as more Villages and staff housing are built, to a level one-seventh the current population. This implies that the University would be "self-sufficient" by about 2012, with only a very small portion of the staff living off-campus.

STUDY METHODOLOGY

The first task is to identify the study area and time frame. Based on the location of the project and previous TIARs performed for the site, the four major intersections which would be utilized by drivers to the project site are identified on **Figure 1** and listed below:

- Queen Kaahumanu Highway Extension at Nani Kailua Drive
- Queen Kaahumanu Highway Extension at Hualalai Road
- Kuakini Highway at Hualalai Road
- Kuakini Highway at Oni Oni Street/Walua Road

Two future analysis years were selected based on the development schedules for the original and proposed master plan projects. The first analysis year is 2010 to coincide with completion of the original master plan. The second analysis year is 2016 when Village Seven is scheduled to be completed. The student population was not considered to be a factor in trip generation since the students are expected to remain on campus and not have cars, while the number of external trips would change with staff size and housing. The academic and athletic facilities proposed for the new campus were not considered in the timetable since they are not expected to be external trip generators. These facilities are primarily resources for use by the University staff and students, who would already be on campus, and will be available to the greater community for special events only.

EXISTING CONDITIONS

A survey of the existing roadway and traffic conditions was made in April 2004 and January 2005.

Existing Roadways

The roadways of interest in the study area include the Queen Kaahumanu Highway Extension (a.k.a. Hawai'i Belt Road), Kuakini Highway, Hualalai Road, Nani Kailua Drive, Oni Oni Street and Walua Road.

Queen Kaahumanu Highway Extension is the major north-south arterial passing through Kailua. It is a continuation of Queen Kaahumanu Highway that extends from Kawaihae Road in the north to the merge with Kuakini Highway in the south. The highway and extension are part of State Routes 11 and 19 that form part of the circle island route. Queen Kaahumanu Highway Extension is a two-lane highway but has two south bound lanes in the vicinity of Henry Street. There are traffic signals and separate turning lanes at major intersections along this route. The highway is posted for 35 miles per hour speed limit north of Nani Kailua Drive and 45 miles per hour south of Nani Kailua Drive. The State DOT has jurisdiction over this roadway.

Kuakini Highway is a two-lane highway under the jurisdiction of the County of Hawai'i and is the middle of three north-south routes through Kailua-Kona. The highway previously served as the island's north-south highway until the completion of the Queen Kaahumanu Highway Extension. Kuakini Highway has a 24-foot pavement width and has a 35 miles-per-hour posted speed limit.

Hualalai Road is a two-lane collector roadway that provides mauka-makai access from Ali'i Drive to Queen Kaahumanu Highway Extension and points mauka. Nani Kailua Drive is another two-lane collector road that provides access through the Pines subdivision between Queen Kaahumanu Highway Extension and Hualalai Road. It also serves the Kailua View Estates subdivision mauka of the highway extension. Oni Oni Street is a two-lane local road that is the only access into the Kona Hillcrest subdivision.

Walua Road is a two-lane collector road that provides mauka-makai access between Ali'i Drive and Kuakini Highway. These roadways are identified on **Figure 1**.

Two of the study intersections are on Queen Kaahumanu Highway Extension. The Nani Kailua Drive intersection has four approaches and is signalized. There are single through lanes and separate left and right turn lanes on each of the highway approaches, while both Nani Kailua Drive approaches have a through/left turn lane and a separate right turn lane. The mauka and makai approaches of Hualalai Road to the highway are offset by several hundred yards from each other so that they operate as separate T-intersections. Only the makai approach was analyzed in this study. The Hualalai Road intersection is unsignalized with separate turning lanes on all approaches.

The Kuakini Highway/Hualalai Road intersection is the southernmost signalized intersection on Kuakini Highway in Kailua-Kona. Both of the Kuakini Highway approaches have separate left turn lanes. The Hualalai Road approaches have different lane configurations. The mauka bound approach has a separate left turn lane while the makai bound approach has a separate right turn lane.

Oni Oni Street and Walua Road intersect Kuakini Highway directly across from each other. Oni Oni Street intersects Kuakini Highway from mauka and has a one lane approach. Walua Road intersects from makai and has a through/left turn lane and a separate right turn lane. Both approaches of Kuakini Highway do not have left turn lanes. The intersection is not signalized and both side street approaches are stop sign controlled.

Traffic Volumes

The University of the Nations is expected to generate its peak traffic during the morning and afternoon commuter hours. Traffic counts taken at the four study intersections on Queen Kaahumanu Highway Extension and Kuakini Highway in 2004 during the morning and afternoon peaks for other proposed projects in the area were utilized. These counts, although two years old, are applicable to this study because of the long forecast time frames (6 and 12 years) of this study. Traffic counts were taken on Queen

Kaahumanu Highway Extension on Tuesday and Wednesday, April 13 and 14. The traffic counts on Kuakini Highway were taken on Tuesday and Thursday, April 6 and 8.

Traffic turning movement counts require workers to station themselves by each study intersection and record each vehicle movement as through or turning movements by 15 minute intervals. The worksheets for the traffic counts are included in **Appendix A**.

The resultant peak hour movements are summarized on **Figure 3**, with traffic volumes over five vehicles per hour (vph) rounded to the nearest five. The predominant direction of travel on Queen Kaahumanu Highway Extension is north bound in the morning peak and south bound in the afternoon peak, although the afternoon north bound volumes are almost equal to the south bound volumes. The volumes of left turns at the Nani Kailua Drive intersection on the makai bound, south bound and mauka bound approaches are almost equal in the morning peak, and are highest on the south bound and mauka bound approaches in the afternoon.

The volume of left turns from Hualalai Road into Queen Kaahumanu Highway Extension is low, 1 vph in the morning peak and 5 vph in the afternoon peak. These small volumes indicate the level of difficulty in making this movement and show these turns are easier made at the nearby signal-controlled intersection at Nani Kailua Drive.

The dominant traffic volumes on Kuakini Highway are north bound in the morning and south bound in the afternoon. The Kuakini Highway/Hualalai Road intersection shows relatively high left turn movements on three of the four approaches: the north bound, south bound and mauka bound approaches. The north and south bound approaches have leading left turn traffic signal phases while the mauka bound approach has a leading green phase to accommodate the high volumes of left turns.

The 2004 traffic volumes are compared to the 2002 volumes counted for the "Traffic Impact Analysis Report for the U of N Bencorp Development" (First Revision, August 2003) by M&E Pacific, Inc., on **Figure 4**. The top graphic of each figure shows the 2002 volumes while the bottom graphic repeats the 2004 volumes shown on **Figure 3**. The bottom figure also shows the combined volumes on each approach, the change in

volume between the two years, and the percent change.

The results for the two main north-south routes are mixed. For the morning peak volumes shown on **Figure 4A**, the north bound approach of Queen Kaahumanu Highway Extension increased 3% at Hualalai Road while decreasing 6% at Nani Kailua Drive. The north bound volumes on Kuakini Highway remained unchanged at Walua Road while increasing 24% at Hualalai road. During the afternoon peak, the south bound approach volumes on Queen Kaahumanu Highway Extension were relatively unchanged, decreasing 1% at Nani Kailua Drive while increasing 1% at Hualalai Road. The south bound volumes on Kuakini Highway showed larger changes, decreasing 6% at Hualalai Road while increasing 11% at Walua Road. The north bound volumes at both intersections showed large decreases in traffic.

The results are also mixed for the mauka-makai side streets. Traffic on the makai bound approach of Nani Kailua Drive at Queen Kaahumanu Highway Extension increased 9% in the morning but decreased 21% in the afternoon. The mauka bound approach traffic volumes decreased 5% in the morning and increased 28% in the afternoon. The mauka bound approach traffic volumes of Walua Road at Kuakini Highway increased 27% in the morning but decreased 8% in the afternoon. Likewise, traffic volumes on the makai bound approach of Hualalai Road increased 7% in the morning but decreased 18% in the afternoon.

A traffic turning movement count was taken at the entrance to the University of the Nations on Kuakini Highway on January 13, 2005. The traffic volumes are shown on **Figure 5** with volumes over five vph rounded to the nearest five. The inbound and outbound volumes are very low for what can be expected for a campus with 300 students and 250 staff. This is because the great majority of students live on campus and much of the staff live either on campus or within walking distance. The traffic counts showed a higher volume of inbound than outbound trips in the afternoon peak period, while the opposite should have been expected. University officials attributed this to resident staff returning to campus from personal errands and non-resident staff returning for dinner with the other staff and students.

Figure 5 also compares the morning and afternoon peak hour counts with similar counts taken in 2000. The right graphic also shows the combined approach volume for the campus roadway, and the volume change and percentage change. For the Kuakini Highway approaches, only the left and right turn volumes into the campus are compared. The comparison shows that traffic volumes into and out of the campus has changed only slightly in five years. During the morning peak, inbound traffic has increased from 95 vph in 2000 to 100 vph in 2005. Outbound traffic increased from 35 to 45 vph. Although the latter represents a 29% increase, there was only an increase of 10 vph. During the afternoon peak, inbound traffic increased from 45 vph to 70 vph, which is only a 25 vph increase. Outbound traffic volumes remained the same at 55 vph. During this five year period, the enrollment remained the same at about 300 students. By comparison, peak hour, peak direction through traffic on Kuakini Highway increased by 200 vph (55%) in the morning and 65 vph (17%) in the afternoon.

The State DOT takes traffic counts every two years at selected roadway sections on Hawai'i. Two of these count stations, the Queen Kaahumanu Highway Extension/Hualalai Road intersection and the Kuakini Highway/Hualalai Road intersection, are at the study intersections. The data shown on **Figure 6** gives the historical trend of daily traffic on these roadways.

Daily two-way traffic volumes for the four approaches of the Kuakini Highway/Hualalai Road intersection are shown for 1992 to 2002. Traffic has increased 39% on the south leg of Kuakini Highway in ten years, with all of the growth in the last two year period. Traffic has remained constant on the west leg of Hualalai Road, dropped 33% on the east leg of Hualalai Road, and decreased 20% on the north leg of Kuakini Highway. Speculative reasons for the stable/decreasing traffic on the three approaches could be laid on the stagnant visitor market following the 9/11 incident. The increase on the south approach in the last two years could be attributed to the development of two commercial centers to the south of Hualalai Road with large parking lots fronting Kuakini Highway.

The traffic volumes on Queen Kaahumanu Highway from 1994 to 2004 shows constant growth, with an annual growth rate of 3.8% on the south leg and 2.7% on the north leg, and an average growth rate of 3.2%. The daily two way traffic volumes on Hualalai Road have declined 12% in the ten year interval.

PROPOSED ROADWAY IMPROVEMENTS

The State DOT and the County of Hawai'i each have roadway improvements planned in the study area. The State DOT is currently widening Queen Kaahumanu Highway to a four lane divided highway north of Henry Street. This phase of the widening project is expected to be completed by mid-2008. This change is not expected to affect traffic patterns in the study area. They also expect to initiate planning studies for the widening of Queen Kaahamanu Highway Extension and Kuakini Highway from Henry Street to Kamehameha III Road soon to determine the feasibility of this project. The State does not have a start date for the construction of this project.

The County of Hawai'i has begun widening Kuakini Highway to four lanes between Palani Road and Hualalai Road and improving the traffic signals. These improvements would significantly increase the capacity of Kuakini Highway and add more lanes to Kuakini Highway at the Hualalai Road intersection. The northbound approach would have two through lanes in addition to the left turn and right turn lanes. A right turn lane would be added to the southbound approach. These improvements are expected to significantly improve the traffic operations at this intersection. As will be discussed later, these improvements in themselves would not change the traffic patterns in the study area, but combined with increased traffic congestion on Queen Kaahumanu Highway Extension and completion of the Kahului to Keauhou Parkway, some traffic diversion from Queen Kaahumanu Highway Extension to Kuakini Highway can be expected.

The County was planning to begin construction of the Kahului to Keauhou Parkway (f.k.a. Ali'i Highway) between the Queen Kaahumanu Highway Extension and Keauhou in 2004. This new two lane roadway is intended to divert traffic from the Queen Kaahumanu Highway Extension, Kuakini Highway and Ali'i Drive to improve their traffic

operations. The first segment between Lako Street extension and Keauhou was scheduled for completion by 2007. The second segment to Queen Kaahumanu Highway Extension was expected to be complete by 2009. However, litigation has delayed start of construction indefinitely and County officials cannot provide any revised completion dates.

When completed, this roadway improvement project can be expected to cause shifts in traffic between Queen Kaahumanu Highway Extension, Kuakini Highway and Ali'i Drive in the study area. The "Kahului to Keauhou Parkway Traffic Analysis Report" (August 2000) prepared by Julian Ng, Inc., developed traffic forecasts for eight scenarios on roadway segments south of where the parkway would intersect Queen Kaahumanu Highway Extension. Comparison of "build" and "no build" traffic volumes showed that traffic would decrease 22% on Queen Kaahumanu Highway Extension, 47% on Kuakini Highway and 15% on Ali'i Drive with the parkway built. The Ng report did not address changes in traffic volumes on roadway segments north of the parkway intersection.

Due to the uncertainties associated with the Kahului to Keauhou Parkway and the widening of Queen Kaahumanu Highway Extension south of Henry Street, three different scenarios of roadway improvements were analyzed:

- Scenario 1 assumes that neither proposed roadway improvement would be built, so that this would represent the no-build case.
- Scenario 2 assumes that the Parkway would be built by 2010.
- Scenario 3 assumes that both the Parkway and the highway widening would be constructed by 2016. The highway widening project realistically could not be completed by 2010.

In all, there would be five combinations of three scenarios and two forecast years:

1. Scenario 1, no improvements, 2010
2. Scenario 1, no improvements, 2016
3. Scenario 2, parkway only, 2010
4. Scenario 2, parkway only, 2016
5. Scenario 3, parkway and highway widening, 2016.

TRAFFIC FORECAST

The Student Villages, Staff Housing Community, and expanded educational and recreational facilities are all components that impact student enrollment and staff levels, and are expected to be completed by 2016. As previously stated, this study analyzed traffic conditions for 2010 and 2016.

The traffic forecasting methodology consisted of three steps. The first step was to forecast ambient traffic representing traffic growth on the area roadways with the current campus in place. The second step was to forecast the traffic volumes that would be generated from the master plan elements in each of the two analysis years. The last step was to combine the ambient traffic with the project generated traffic to obtain the total with project traffic forecasts for the two analysis years. The traffic operations with the ambient and total with project forecasts were compared to identify traffic impacts, as described in the next section.

Ambient Traffic Forecast

Ambient traffic on the study area roadways can be expected to increase due to regional growth and new projects in the area. Ambient traffic forecasts were first prepared for 2010 and 2016 scenarios 1, and then adjusted to obtain the 2010 and 2016 scenarios 2 (with parkway) and 2016 scenario 3 (with parkway and 4 lane Hawai'i Belt Highway) forecasts.

The 2010 scenario 1 forecast analysis year was calculated first. Traffic growth to 2010 was assumed to come from known future projects and general area growth. Ambient traffic forecasts at the four study intersections for the year 2006 were obtained from the "Traffic Impact Analysis Report Kona Oasis Condominium" (April 2004) and "Traffic Impact Analysis Report Kona Hale Alii" (May 2004), both prepared by M&E Pacific, Inc. The 2006 forecasts were calculated by increasing 2004 volumes (from **Figure 3**) by 5% (2-1/2%/year) on Kuakini Highway and 4% (2%/year) on Queen Kaahumanu Highway. The traffic that would be generated by the following new projects in the area (identified with the assistance of County staff) was added to these volumes.

- Pualani residential subdivision on Hawai'i Belt Road – 400 units in 2010.
- Hualalai Village on Hualalai Road – 103 condominium units that are under construction and are part of the new master plan.
- Pua'a elderly housing on Hualalai Road – 126 units.
- Apartment building on Hualalai Road – 164 units.
- Kona Hawaiian Village on Ali'i Drive and Kuakini Highway – 270 time share units.
- Kona Sea Ridge on Ali'i Drive – 137 multi-family units.
- Ali'i Cove on Ali'i Drive and Walua Road – 200 multi-family units.
- Lava on Kuakini Highway – 212 multi-family units.
- 100 other units on Ali'i Drive (assumed to include Kona Sea Villas).
- Hotel on Walua Road – 80-90 rooms.
- Commercial lots on Walua Road – 40,000 square feet of retail floor area assumed.

Traffic generated by the first four projects was assigned to Queen Kaahumanu Highway Extension and Kuakini Highway. Traffic from the remaining projects was assigned to Kuakini Highway via Hualalai Road and Walua Road. Traffic forecasts from traffic impact analysis reports were utilized when available. Otherwise, the traditional trip generation, distribution and assignment procedure was used to forecast the additional volume of trips on the study area roadways.

The resultant 2006 traffic forecast was then extended to 2010 by increasing by 8% (2%/year) on Queen Kaahumanu Highway Extension and Kuakini Highway, and 4% (1%/year) on all other roadways. Traffic volumes into and from Oni Oni Street were not increased since it serves a stable neighborhood. The resultant 2010 scenario 1 ambient traffic forecast is shown on **Figure 7** with volumes over five vph rounded to the nearest five. The 2010 traffic forecast was then extended to 2016 by increasing by 12% (2%/year) on Queen Kaahumanu Highway Extension and Kuakini Highway, and 6% (1%/year) on all other roadways. The resultant 2016 scenario 1 ambient traffic forecast is shown on **Figure 8** with volumes over five vph rounded to the nearest five.

For the scenarios 2 and 3 forecasts, it was assumed that through traffic volumes on Queen Kaahumanu Highway Extension and Kuakini Highway would change while traffic volumes into and from the side streets would remain unchanged. The changes would be relative to the ambient traffic volumes for scenario 1. The aforementioned "Kahului to Keauhou Parkway Traffic Analysis Report" shows AM and PM peak hour traffic volumes on Queen Kaahumanu Highway Extension, Kuakini Highway, Ali'i Drive and the proposed parkway with various combinations of roadway improvements for 2020. The following scenarios from the report correspond to this study's scenarios 1, 2, and 3, respectively:

- No-Build 1 (Exhibit 3)
- Build 1 with proposed parkway (Exhibit 7)
- Build 2 with proposed parkway and 4 lane Hawai'i Belt Hwy (Exhibit 8)

The peak hour traffic volumes for the 2020 no-build scenario from the parkway report are shown on **Figure 9**, for the 2020 build 1 scenario on **Figure 10**, and for the 2020 build 2 scenario on **Figure 11**. The Ng study did not forecast traffic volumes north of the parkway's intersection with Queen Kaahumanu Highway Extension and Kuakini Highway. Therefore, the traffic volumes on these roadways north of the parkway were extrapolated from the reported volumes and are shown as derived volumes on **Figures 10** and **11**. For the build 2 scenario which corresponds to this study's scenario 3, the volume of traffic on Kuakini Highway was thought to be too high; therefore, a portion of this traffic between the parkway and the Queen Kaahumanu Highway/Kuakini Highway junction was diverted to Queen Kaahumanu Highway. These adjusted volumes are shown as derived volumes on **Figure 11**.

By comparing the traffic volumes on **Figures 10** and **11** with those on **Figure 9**, it was possible to estimate the relative changes in traffic on the two roadway facilities. The relative changes for scenarios 2 and 3 for 2020 are shown on **Figures 10** and **11** as "Change from No build scenario" and are summarized in the following table.

RELATIVE CHANGES FOR 2020	SCENARIO 2		SCENARIO 3	
	AM	PM	AM	PM
Queen Kaahumanu Highway Northbound	-95	-120	+380	+190
Queen Kaahumanu Highway Southbound	-100	-155	+330	+420
Kuakini Highway Northbound	+150	+150	+290	+250
Kuakini Highway Southbound	+120	+165	-55	+350

These changes to 2020 traffic forecasts were then adjusted to this study's analysis years of 2010 and 2106, respectively. To develop these adjustment factors, the first step was to determine the change in traffic volumes from 2004 to 2010 relative to the change from 2004 to 2020 traffic volumes for scenario 1. This ratio was the growth ratio from 2004 to 2010. Likewise, the ratio of change from 2004 to 2016 over the change from 2004 to 2020 traffic volumes was calculated to obtain the growth ratios from 2004 to 2016. These growth ratios were calculated for both directions of each highway in the AM and PM peak hours and found to be similar for both directions; therefore, one growth ratio was used for each highway. The following growth ratios were obtained:

	2010		2016	
	AM	PM	AM	PM
Queen Kaahumanu Highway	34%	35%	66%	67%
Kuakini Highway	45%	48%	72%	74%

The positive volume changes in traffic were multiplied by the above growth ratios to obtain the change in traffic volumes for the year, scenario, and analysis peak hour. The negative volumes changes were multiplied by the difference of 1 less the growth ratio, implying that traffic would decrease. The resultant relative change volumes for 2010 are shown in the following table:

RELATIVE CHANGES FOR 2010	SCENARIO 2	
	AM	PM
Queen Kaahumanu Highway Northbound	-72	-78
Queen Kaahumanu Highway Southbound	-76	-101
Kuakini Highway Northbound	+68	+53
Kuakini Highway Southbound	+54	+58

The resultant relative change volumes for 2016 are shown below.

RELATIVE CHANGES FOR 2016	SCENARIO 2		SCENARIO 3	
	AM	PM	AM	PM
Queen Kaahumanu Highway Northbound	-32	-40	+230	+125
Queen Kaahumanu Highway Southbound	-34	-51	+200	+280
Kuakini Highway Northbound	+108	+111	+210	+185
Kuakini Highway Southbound	+87	+122	-15	+260

The relative changes in volumes for scenario 2 show negative values on Queen Kaahumanu Highway Extension and positive values on Kuakini Highway. The relative change volumes for scenario 3 show generally positive values except for Kuakini Highway southbound in the AM peak hour.

These relative changes in volumes were then added to their respective through volumes on Queen Kaahumanu Highway Extension and Kuakini Highway for scenario 1 to obtain the adjusted ambient volumes for scenarios 2 and 3. The results are shown on **Figure 12** for 2010 scenario 2, **Figure 13** for 2016 scenario 2, and **Figure 14** for 2016 scenario 3, with volumes over five vph rounded to the nearest five.

Project Generated Traffic

The traditional procedure of trip generation, distribution, and assignment was used to forecast the number of trips that would be generated by the proposed projects, the distribution of these trips, and the specific intersection turning movements at the study intersections that would be utilized.

The trip generation step forecasts the volume of vehicle trips that would be generated by the proposed projects during the two analysis periods. Due to the near self-sufficient nature of the University, the traditional trip generation rates from the Institute of Transportation Engineers' Trip Generation (Seventh Edition, 2003) were not applicable to forecast AM and PM peak hour trips that would be generated by the University. Rather, the existing traffic volumes entering and exiting the University were categorized into four components: commuting staff, resident staff trips, non-resident students, and

deliveries. The estimated composition of current trips is shown on **Table 1** based on the traffic count taken at the University driveway to Kuakini Highway in January 2005.

To calculate the volume of trips that would be generated in 2010 and 2016, the different trip components were adjusted proportionally with their change in population. The number of trips by non-resident staff would decrease with the decline in their population. The non-resident student trips would disappear when non-residents are not permitted. The number of trips by the resident staff was based on trip generation rates: 0.4 in the AM peak and 0.5 in the PM peak hour. These rates are lower than conventional rates for townhouses, as discussed below. The proportion of inbound and outbound trips by resident staff in the PM peak hour is expected to become more balanced to 60% in the future rather than the current 83%. The number of deliveries in both peak hours is not expected to increase with the student population, since larger delivery vehicles or more non-peak hour trips could be utilized. The six single family homes were not included in the analysis since their locations and timetables have not been determined, and they represent a very small number of trips. The 2010 and 2016 trip generation analysis for the University of the Nations is summarized on **Table 1**. The volume of inbound trips in the AM peak hour is expected to decline while the volume of outbound trips is expected to increase. During the PM peak hour, the volumes of inbound and outbound trips are forecast to increase slightly.

The forecast number of trips generated by the resident staff per staff residential unit (both Village and Staff Housing) is compared to the rates forecast for the Hualalai Village, Phase 1 below. The rates for the residential staff units are lower than a comparable multi-family unit since staff would not have to commute.

	TRIP GENERATION RATES	
	AM PEAK	PM PEAK
Staff Housing Units	0.40	0.50
Hualalai Village	0.51	0.61

The trip distribution step divides the generated trips by directions of travel to/from the project site. The trip distribution factors were based on the existing distribution of traffic entering and leaving the University of the Nations driveway as shown on **Figure 5**, and updated for the future years. The results of this analysis are shown on **Table 1**.

The trip assignment step assigns the distributed trips as turning movements to the study intersections. The project generated trips were assigned to the north and south project driveways based on whether they were from the north campus or south campus. Trips from the Villages and staff housing were assumed to access Kuakini Highway. Trips from the Hualalai Village that originally access Kuakini Highway via Hualalai Road were diverted to the mauka-makai service road. These diverted trips are shown negative values on the trip assignments figures. The trips were then assigned to the turning movements at the adjoining intersections based on the current distribution of turning movements at these intersections. One trip assignment was made for 2010 and assumed applicable to scenarios 1 and 2 and is shown on **Figure 15**. The 2016 trip assignment was applicable for all three scenarios and is shown on **Figure 16**. The traffic volumes are not rounded.

Total Forecast Volumes

The 2010 project generated volumes from **Figure 15** were added to the 2010 ambient traffic forecasts for scenarios 1 and 2 from **Figures 7** and **12**, respectively, to obtain the total with project traffic forecasts on **Figures 17** and **19**. Likewise, the 2016 project generated volumes from **Figure 16** were added to the 2016 ambient traffic forecasts for scenarios 1, 2 and 3 from **Figures 8, 13** and **14**, respectively, to obtain the total with project traffic forecasts on **Figures 18, 20** and **21**. Traffic volumes over five vph are rounded to the nearest five.

LEVEL OF SERVICE ANALYSIS

The concept of level of service is used to quantify the quality of traffic flow on roadway facilities. The Transportation Research Board has developed procedures to calculate level of service value(s) by measuring traffic volumes against the capacities of different types of roadway facilities. Their Highway Capacity Manual (2000) describes the various procedures developed for freeways, highways, signalized and unsignalized intersections, etc. A comparison of levels of service for the different forecast scenarios can give an indication of the traffic impacts of ambient traffic growth and the proposed project. The levels of service for the total with project forecasts were compared to the levels of service for the corresponding ambient forecasts to determine if the proposed project would have an adverse traffic impact. A change in level of service to unacceptable levels would be one indication of an adverse traffic impact.

Unsignalized Intersection Analysis

The procedure used for analyzing unsignalized intersections calculates vehicle delays and levels of service based on the distribution of gaps in traffic on the major street and driver judgment in selecting gaps through which to execute turns. For two-way stop intersections where only the minor street approaches are controlled by a stop sign, levels of service are calculated for the critical turning movements including outbound movements from the stop-controlled approach, and left turns from the main road to the minor street. The procedure does not calculate an overall intersection level of service nor does it identify when the through traffic on the main road is over capacity.

The Highway Capacity Manual defines the relationship between level of service and delay (in seconds/vehicle) for unsignalized intersections as shown in the following table. Levels of service A to E are considered acceptable for unsignalized intersections. Level of service F (with average delays longer than 50 seconds) is considered undesirable and would indicate the probable need for mitigation. However, level of service F conditions may be tolerated for certain conditions when delays are not excessive and there are no real feasible mitigating measures.

LEVEL OF SERVICE	DELAY (Seconds/Vehicle)
A	< 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	> 50.1

Table 2 shows the levels of service for each critical turning movement at the unsignalized intersections for the AM and PM peak hours, for the existing, ambient and total with project forecast volumes. Scenario 1 analyses include the 2004 existing volumes, and 2010 and 2016 forecast volumes; scenario 2 includes the 2010 and 2016 forecasts; and scenario 3 only has the 2016 forecast.

The Queen Kaahumanu Highway Extension/Hualalai Road intersection currently shows a problem on one turning movement in both AM and PM analysis periods. The eastbound left turn movement from Hualalai Road is already at level of service F and would remain so for all forecast conditions. This poor level of service reflects the difficulty in making this movement and is the reason for the low volumes of these turns counted in both peak periods.

The levels of service on the other two intersection movements are currently at acceptable levels and would remain unchanged during the morning peak hour for the ambient and total with project forecasts for 2010 and 2016 scenarios 1 and 2. With the widening of Queen Kaahumanu Highway Extension for scenario 3, the Hualalai Road right turn would improve to level of service B while the left turn from the highway into Hualalai Road would decline to level C in 2016. Level of service C is not acceptable for this left turn movement based on traffic observations. This would indicate that unsignalized intersection control would not be acceptable for scenario 3 in 2016.

During the afternoon peak, the northbound left turn from Queen Kaahumanu Highway Extension into Hualalai Road is currently at level of service B and is forecast to remain

at that level for the 2010 scenario 1 and the 2010 and 2016 scenario 2 forecasts. However, it would change to an unacceptable level of service C for the 2016 scenarios 1 and 3 forecasts. The right turn from Hualalai Road is forecast to change to level of service E for the 2010 scenario 1 and 2016 scenario 2 forecasts, and to level F for the 2016 scenario 1 forecasts. This change is primarily due to the higher traffic volumes on the highway and less due to increases in traffic on Hualalai Road. Even if there were no increase in traffic from Hualalai Road, increased traffic volumes on the highway would cause the levels of service for the side street movements to decrease.

The above analysis indicates that mitigating measures would be needed at this intersection by 2016 due to increased ambient traffic volumes. The signalization of the intersection and widening of the highway (scenario 3) would be two long-term measures. The impact of signalizing the intersection is discussed in the next section. If the intersection remains unsignalized, the left turn movement from Hualalai Road onto Queen Kaahumanu Highway Extension should eventually be eliminated for traffic safety. The proposed project is expected to generate few trips through this intersection and is not expected to have any adverse impact upon its traffic operations.

Levels of service at the Oni Oni Street/Walua Road intersection on Kuakini Highway are currently at acceptable levels; although the mauka bound through/left turn movement from Walua Road is already at level of service D in both peak periods. With the traffic increases forecast with all three scenarios, the latter movement would change to level of service F by 2010 for all three scenarios due to the increases in traffic on both Kuakini Highway and Walua Road. A review of the level of service calculation worksheets shows that traffic delays and queues on Walua Road would be considerable, indicating that this problem would require some form of mitigation. The 2016 forecast conditions were not analyzed since it was determined that unsignalized operations would not be feasible by this date.

This analysis indicates the eventual need for mitigation at the Kuakini Highway/Oni Oni Street/Walua Road intersection with or without the proposed project. Traffic signalization when warranted would mitigate the through/left turn problem from Walua

Road and also help the residents using Oni Oni Street. The impact of signalizing the intersection is discussed in the next section. Separate left turn lanes on Kuakini Highway should be considered to facilitate the higher through traffic volumes on the highway. When installed, this traffic signal should be coordinated with the proposed traffic signals at the Kuakini Highway/ Kahului to Keauhou Parkway intersection.

In addition, the traffic forecast volumes on Kuakini Highway for the 2016 scenarios 2 and 3 are near the capacity of a two lane urban highway. This would imply that Kuakini Highway should be widened to four lanes if the Kahului to Keauhou Parkway is built or the Queen Kaahumanu Highway Extension is widened to four lanes. Rather than recommend widening the Kuakini Highway for these scenarios, this study recommends that new traffic forecasts be prepared to determine the impacts of both roadway improvement projects on Kuakini Highway, and if the portion of Kuakini Highway between Hualalai Road and the parkway should be widened.

The outbound and inbound left turn movements at the current (north) University driveway on Kuakini Highway are forecast to have acceptable levels of service for both forecast years and three forecast scenarios. No mitigating measures are required but a separate south bound left turn lane on Kuakini Highway should be provided for enhanced traffic operations and safety.

The movements to the new (south) driveway that would serve the proposed mauka-makai service road are also forecast to operate at acceptable levels of service in 2010 and 2016 for all three scenarios. Mitigating measures other than the previously described separate left turn are not required.

As stated for the Kuakini Highway/Walua Road/Oni Oni Street intersection, the traffic volumes forecast for Kuakini Highway with the 2016 scenarios 2 and 3 are near the capacity of a two lane highway. New traffic forecasts are recommended to determine the impact building the parkway or widening the Queen Kaahumanu Highway would have on Kuakini Highway traffic, and if the portion of Kuakini Highway between Hualalai Road and the parkway should be widened.

Signalized Intersection Analysis

The methodology for analyzing signalized intersections calculates the levels of service for individual approaches and the intersection as a whole based on the average stopped delay per vehicle. The results range from level of service A (best with average delays less than ten seconds) to F (worst with average delays longer than 80 seconds), described as shown on the following table.

LEVEL OF SERVICE	COUNTS DELAY PER VEHICLE (Seconds/Vehicle)
A	< 10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	> 80.1

Many jurisdictions consider levels of service A to D as acceptable for areas like Kailua, with level of service F indicating the need for mitigating measures. A level of service E, although considered undesirable, can be tolerated for minor movements such as left turns. The County of Hawai'i recommends a minimum level of service C for proposed projects, while recognizing that many of their signalized intersections are already at level of service D.

Table 3 shows the level of service for the overall intersection and for each approach at the signalized intersections for the AM and PM peak hours, for the existing, ambient and total with project forecast volumes. Scenario 1 analyses include the 2004 existing volumes, and 2010 and 2016 forecast volumes; scenario 2 includes the 2010 and 2016 forecasts; and scenario 3 only has the 2016 forecast. In addition to the current signalized intersections at Kuakini Highway/Hualalai Road and Queen Kaahumanu Highway Extension/Nani Kailua Drive, the currently unsignalized Queen Kaahumanu Highway Extension/Hualalai Road and Kuakini Highway/Walua Road/Oni Oni Street intersections were also analyzed since traffic signals were recommended as mitigating measures.

The Kuakini Highway/Hualalai Road intersection is currently at level of service C in both peak hours with the current design. It is forecast to remain at level of service C in the AM peak hour for all three scenarios with the improved roadway design. The additional capacity that would be brought about by the current widening of Kuakini Highway would offset the higher forecast volumes, resulting in the same level of service. These results imply that the proposed project would not have an adverse traffic impact during the AM peak hour.

The current and future PM peak hour volumes are higher than their corresponding AM peak hour volumes. As a result, the level of service during the PM peak hour would change from C to D for the total with project forecast for the 2016 scenario 1. Although this change in level of service could be attributed to the proposed project, it is not considered an adverse impact since level of service D is still considered acceptable. The levels of service for both ambient and total with project 2016 scenario 2 forecasts would be at D. The levels of service for both 2016 scenario 3 forecasts would be E. This indicates that the higher south bound through volumes on Kuakini Highway forecast for scenario 3 would require some form of mitigation with or without the proposed project.

One possible mitigating measure is to convert the southbound right turn only lane into a shared through/right turn lane and build a second receiving lane on the south side of the intersection. This second through lane would only need to be extended so that southbound traffic could merge together further downstream, since southbound traffic volumes decrease considerably. But as previously noted, this study recommends a new traffic forecast to determine the impact building the parkway or widening the Queen Kaahumanu Highway Extension would have on Kuakini Highway traffic, and if Kuakini Highway would have to be widened.

The intersection at Queen Kaahumanu Highway Extension and Nani Kailua Drive is currently at level of service C in both the morning and afternoon peak hours. The intersection levels of service would remain at C in 2010 and decrease to D in 2016 for scenarios 1 and 2 in the AM peak, which assumed no widening for Queen Kaahumanu

Highway Extension. For both scenarios in 2016, the Nani Kailua Drive approaches would be at level of service F, indicating unacceptable conditions. The intersection would remain at level of service C for the 2016 scenario 3 due to the widening of Queen Kaahumanu Highway Extension.

During the afternoon peak hour, the intersection level of service with scenario 1 would decline to D in 2010 and to E in 2016 for both ambient and total with project forecasts. For scenario 2, the intersection level of service would remain at C in 2010 and decline to E in 2016. As in the AM peak, the Nani Kailua Drive approaches would be at level of service F for both scenarios in 2016, indicating unacceptable conditions. The intersection would remain at level of service C for the 2016 scenario 3 due to the widening of Queen Kaahumanu Highway Extension.

The above analysis indicates that mitigation is required by 2016, with or without the proposed project. The widening of Queen Kaahumanu Highway to four lanes would mitigate the problems forecast with scenarios 1 and 2. This finding corroborates the findings in the "Keahole to Honaunau Regional Circulation Plan" (February 2003) by Townscape, Inc., which stated, "Thus, by 2020, peak hour volumes per lane will be similar to existing conditions even with the completion of the Mamalahoa Bypass and the Parkway as 2-lane roads. Construction of the two-lane Ke Aka o Keauhou (Ali'i Parkway) and Mamalahoa Bypass will thus alleviate traffic congestion over the next 10 to 20 years but will not accommodate 2020 needs for the region." The proposed project is expected to generate few trips through this intersection and is not expected to have any adverse impact upon its traffic operations.

The Queen Kaahumanu Highway Extension/Hualalai Road intersection is currently unsignalized but widening of the highway and traffic signals were recommended as mitigating measures by 2016. With traffic signals, the intersection would remain at level of service C during the AM peak hour for 2010 and 2016 scenario 1. With scenario 2, the intersection would be at level of service B in 2010 and C in 2016. With the highway widening for scenario 3 in 2016, the intersection level of service would be at B. Signalizing the intersection would also make the east bound left turn easier to make and

would divert vehicles from the Nani Kailua Drive intersection; thereby, helping to improve the level of service at the latter intersection.

The growth in ambient traffic would have a greater impact during the PM peak hour at this intersection. The intersection would be at level of service C in 2010 and D in 2016 with scenario 1, but the Hualalai Road approach would be at an unacceptable level of service E. With scenario 2, the intersection would be at level of service B in 2010 and C in 2016, but the Hualalai Road approach would be at an unacceptable level of service E. With the highway widening for scenario 3 in 2016, the intersection level of service would be at B. The analysis of PM peak hour conditions indicates that a two lane Queen Kaahumanu Highway would not be sufficient by 2016, and that widening to four lanes would be a mitigating measure. This finding corroborates the findings for the Queen Kaahumanu Highway Extension/Nani Kailua Drive intersection that widening the highway to four lanes would be required by 2016.

The Kuakini Highway/Walua Road/Oni Oni Street intersection is currently unsignalized but traffic signals were recommended as a mitigating measure by 2010, or when warranted. With traffic signals and left turn lanes on Kuakini Highway, the intersection levels of service for both AM and PM peak hours in 2010 and 2016, and for all three scenarios would be at acceptable levels of C or better. This indicates that traffic signals and left turn lanes would be sufficient to mitigate the traffic problems forecast with the unsignalized intersection. The project generated trips passing through this intersection are not expected to have any adverse impact upon its traffic operations since there is no change between the ambient and total with project levels of service.

CONCLUSIONS

This study determined that the existing transportation network in the study region would need to be improved to accommodate future regional traffic growth. The current widening of Kuakini Highway between Palani Road and Hualalai Road and improvement of traffic signals will significantly improve traffic operations and provide additional north-south capacity that should accommodate traffic growth on that section of roadway beyond the 2016 study year.

The status of two other roadway improvement projects is uncertain at this time. Litigation has stopped the commencement of construction of the Kahului to Keauhou Parkway. The State DOT has only begun the planning process for the widening of Queen Kaahumanu Highway Extension to four lanes between Henry Street and Kamehameha III Road and there is no definite start of construction date. Three different forecast scenarios were evaluated to consider the uncertainty with implementing these two projects:

- Scenario 1 – No highway improvements, neither project is implemented in 2010 or 2016.
- Scenario 2 – The Kahului to Keauhou Parkway is implemented by 2010.
- Scenario 3 – Both the Parkway and the Queen Kaahumanu Highway widening are implemented by 2016.

The proposed master plan for the University of the Nations would result in very few additional trips being generated. The large projected increase in student enrollment would not increase traffic since the students would live on campus and have very few cars. The accompanying staff increase would be accommodated by a large increase in staff housing so that most of the staff would live on campus, either in the Student Villages or in the Staff Housing Community. Although the staff is forecast to increase from the current 300 to 600+ in 2016, the number of non-resident staff who will have to commute will decrease from 175 to about 25. Several other actions will also serve to reduce the number of external trips. These actions include serving of communal meals

for students and staff, providing preschool and elementary schools for children of staff, and maintaining a pedestrian friendly campus. The number of current and forecast external trips is summarized in the following table.

YEAR	DIRECTION OF TRAVEL	AM PEAK	PM PEAK
2005	Inbound	100	70
	Outbound	45	55
2010	Inbound	100	90
	Outbound	65	80
2016	Inbound	100	130
	Outbound	90	95

Since this traffic would be split between two driveways in the future, the volumes at each would be at reasonable levels and would not require traffic signals. The traffic generated by this proposed project is not expected to have an adverse impact on traffic operations at the study intersections.

References

References

1. *Highway Capacity Analysis Program, Version 1*, Catalina Engineering, Inc., 2003.

2. *Highway Capacity Manual*, Transportation Research Board, National Research Council, Washington, D.C., 2000 Edition.

3. *Kahului to Keauhou Parkway Traffic Analysis Report*, Julian Ng, Inc., August 2000.

4. *Keahole to Honaunau Regional Circulation Plan*, Townscape, Inc., February 2003.

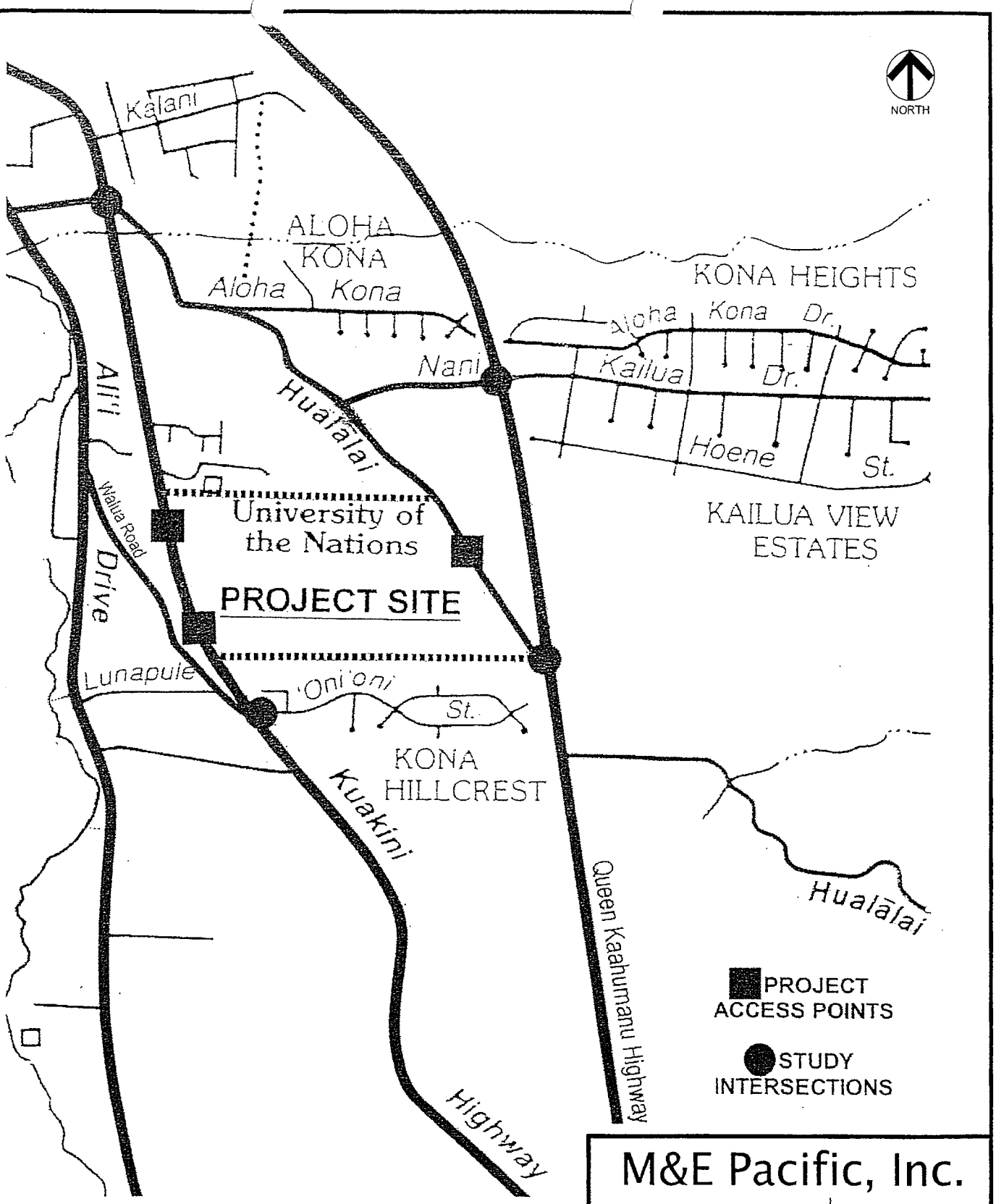
5. *Traffic Impact Analysis Report Kona Hale Alii*, M&E Pacific, Inc., May 2004.

6. *Traffic Impact Analysis Report Kona Oasis Condominium*, M&E Pacific, Inc., April 2004.

7. *Traffic Impact Analysis Report for the U of N Bencorp Development*, M&E Pacific, Inc., First Revision, August 2003.

8. *Trip Generation*, Institute of Transportation Engineers, Seventh Edition, 2003.

Figures



SITE LOCATION &
ROADWAY NETWORK

NOT TO SCALE

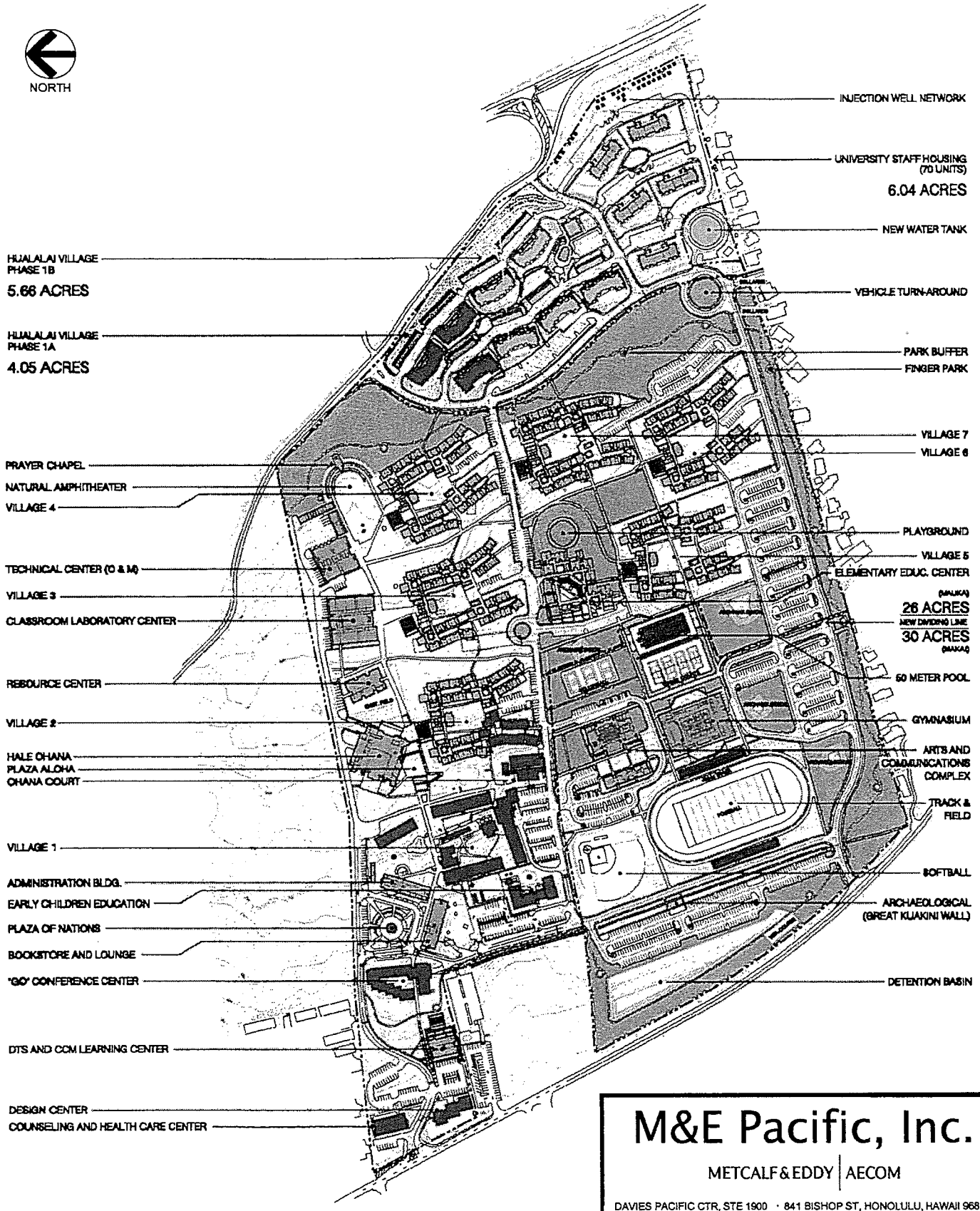
PATH/FILENAME: P:\Projects\Hawaii\3520B914 U of N Banscrp TIAR\Revised\Figure 1.dwg

M&E Pacific, Inc.

METCALF & EDDY | AECOM

DAVIES PACIFIC CTR, STE 1900 · 841 BISHOP ST, HONOLULU, HAWAII 96813

Figure 1
Site Location & Roadway Network
Traffic Impact Analysis Report
University of the Nations
December 2006



SITE PLAN

NOT TO SCALE

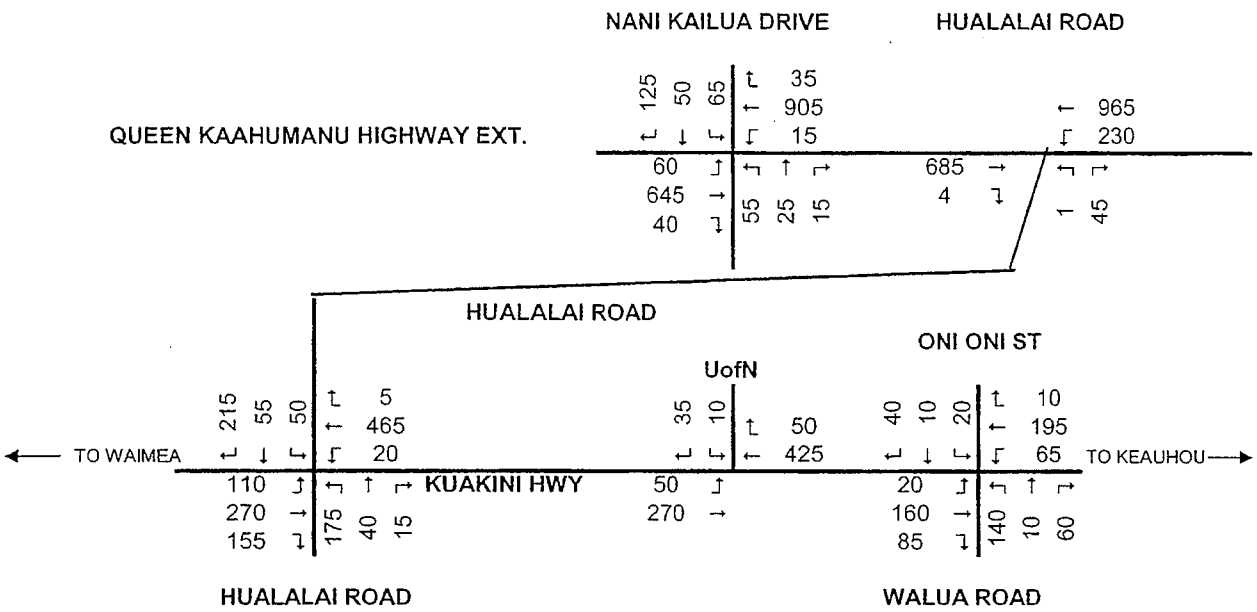
PATH/FILENAME: P:\Projects\Hawaii\36208914 U of N Bancorp TIAR\Revised\Figure 2.dwg

M&E Pacific, Inc.

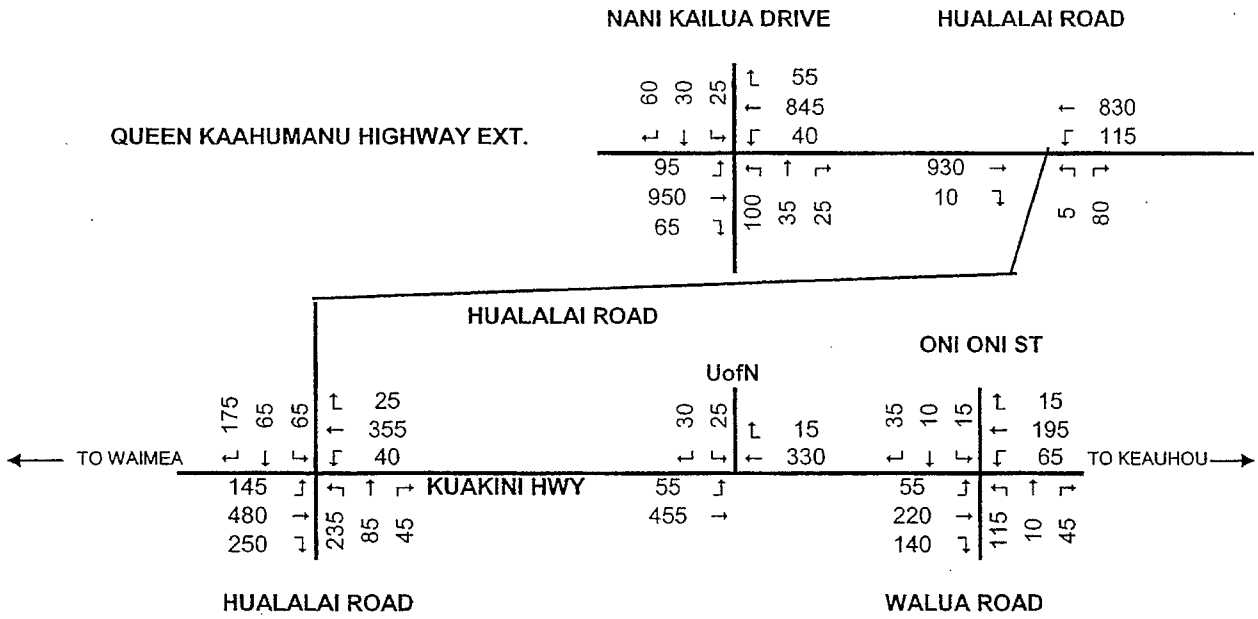
METCALF & EDDY | AECOM

DAVIES PACIFIC CTR, STE 1900 · 841 BISHOP ST, HONOLULU, HAWAII 96813

Figure 2
Site Plan
Traffic Impact Analysis Report
University of the Nations
December 2006



AM PEAK HOUR

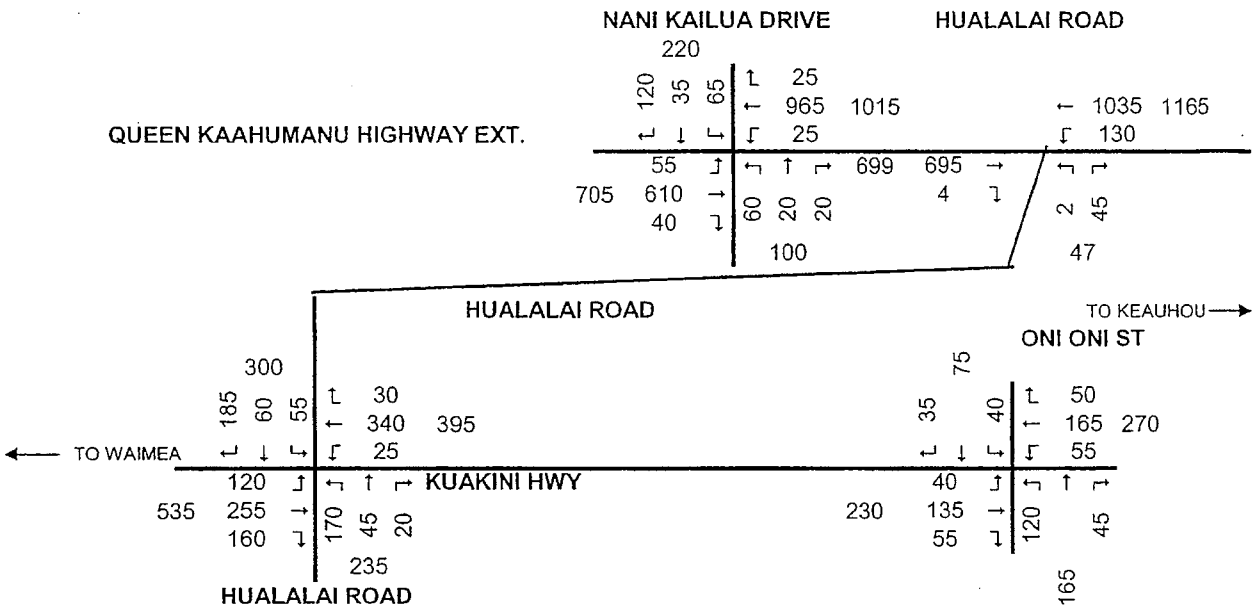


PM PEAK HOUR

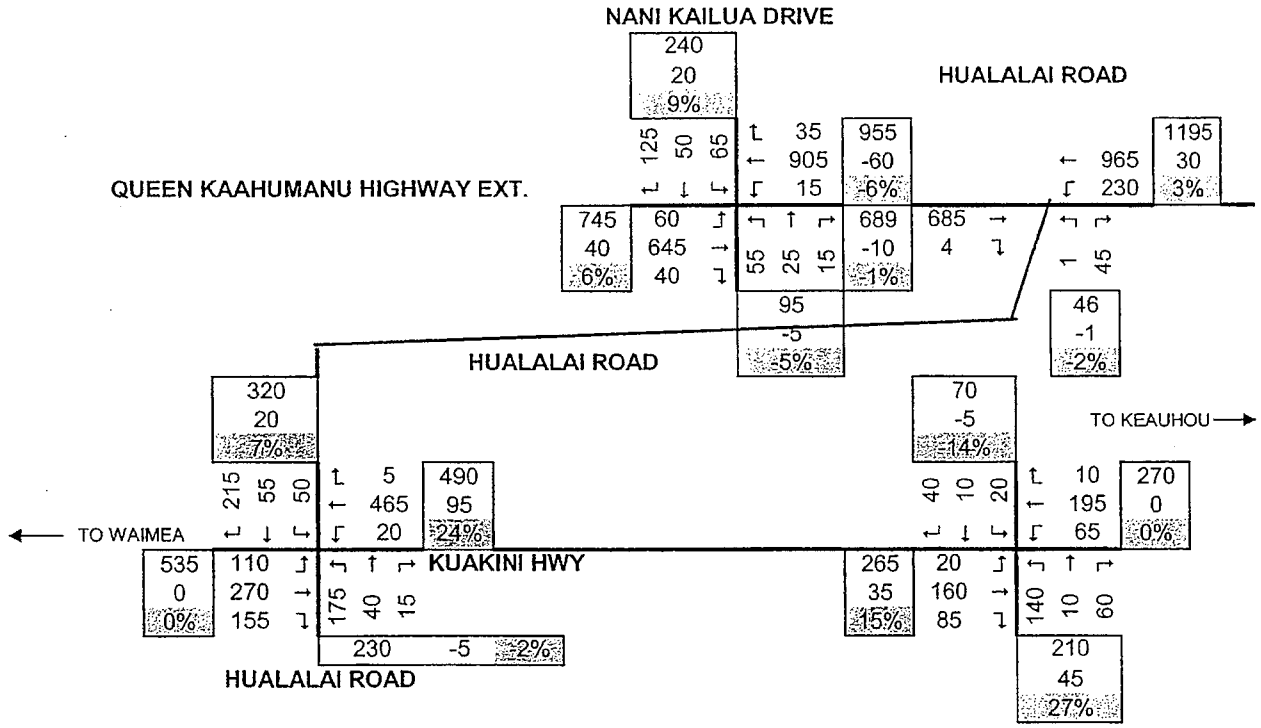
Not to Scale

EXISTING 2004 TRAFFIC VOLUMES

FIGURE 3



SEPTEMBER 2002 TRAFFIC COUNTS



APRIL 2004 TRAFFIC COUNTS

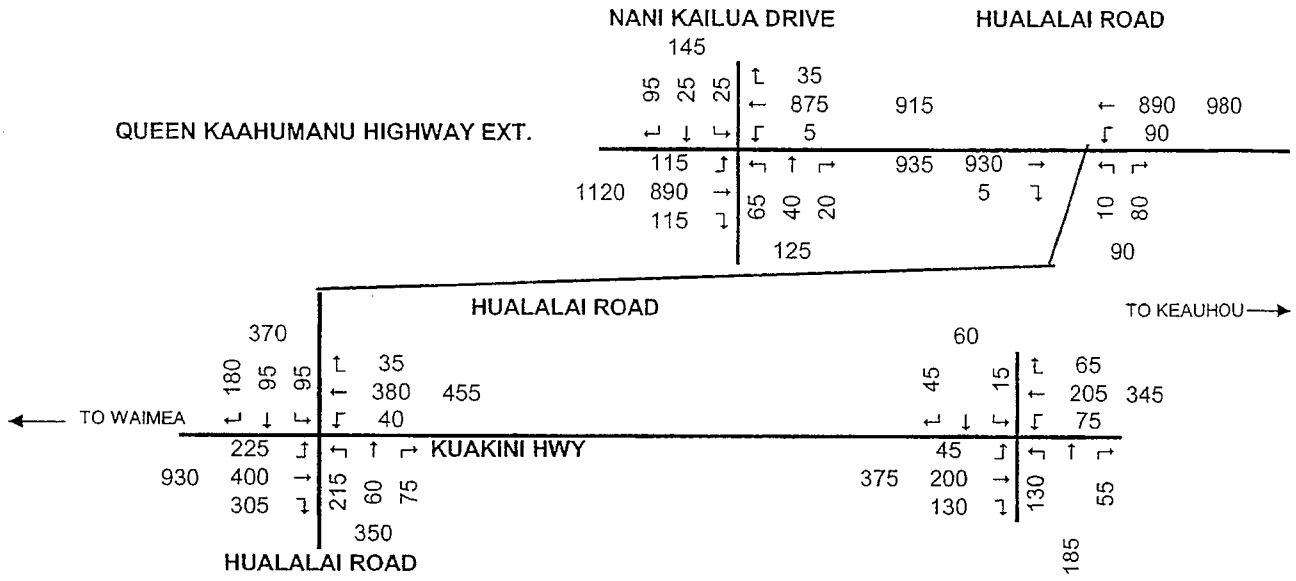
AM PEAK HOUR

Not to Scale

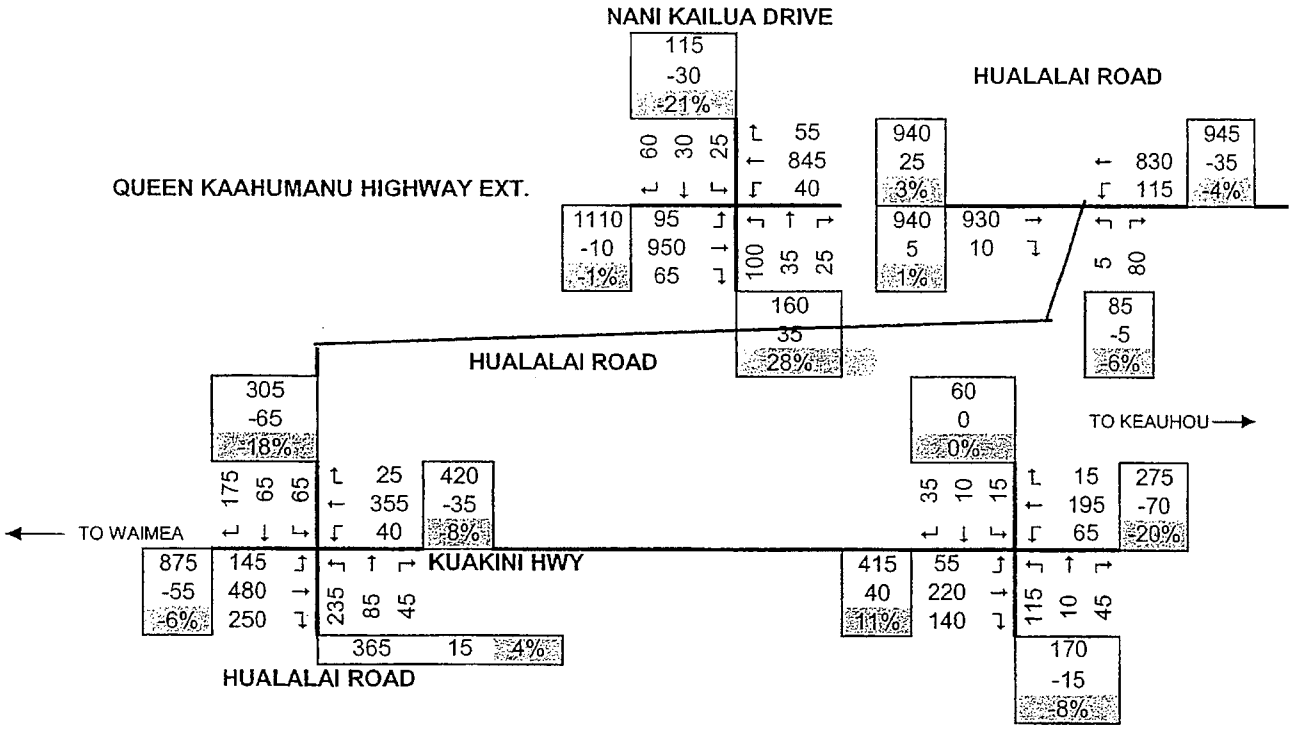
LEGEND

490	Combined approach volume
95	Volume change from 2002 to 2004
24%	Percent change from 2002 to 2004

COMPARISON OF 2002 AND 2004 TRAFFIC VOLUMES
FIGURE 4A



SEPTEMBER 2002 TRAFFIC COUNTS



APRIL 2004 TRAFFIC COUNTS

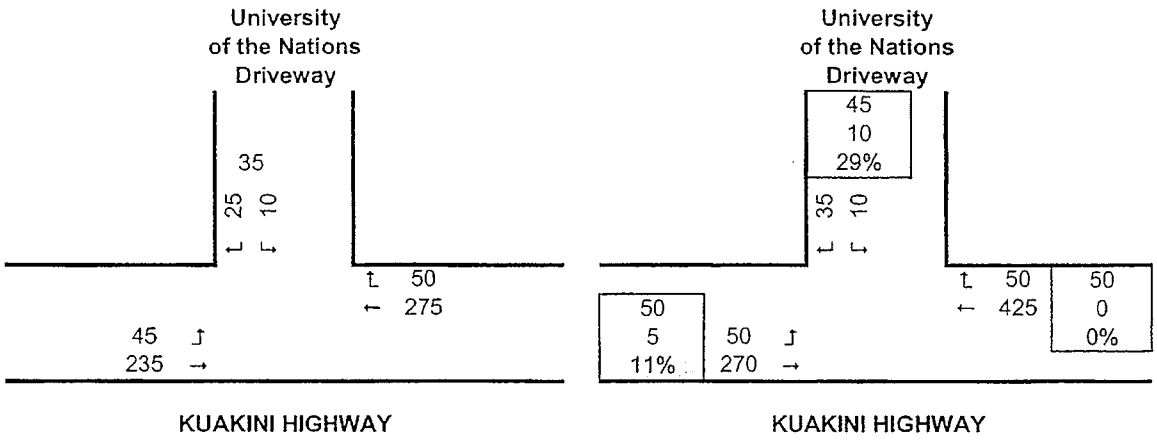
PM PEAK HOUR

Not to Scale

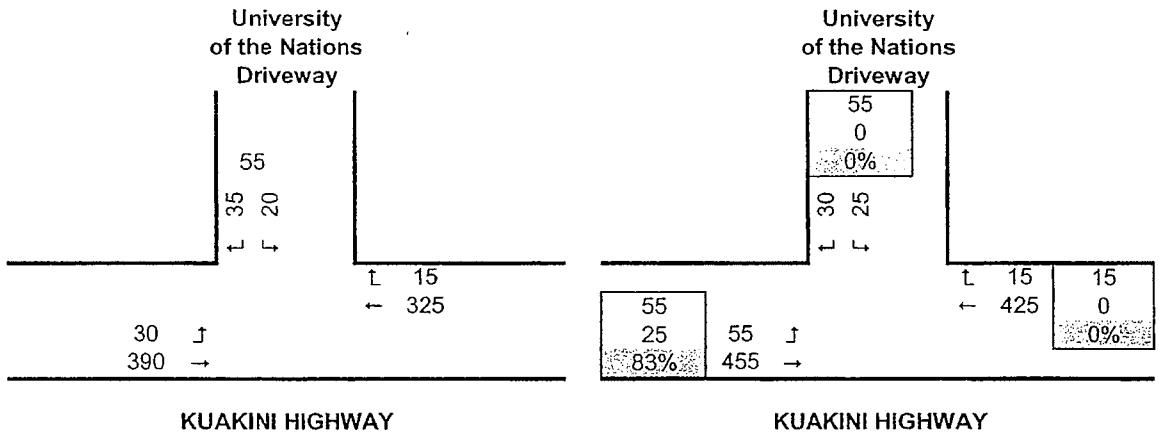
LEGEND

490	Combined approach volume
95	Volume change from 2002 to 2004
24%	Percent change from 2002 to 2004

COMPARISON OF 2002 AND 2004 TRAFFIC VOLUMES
FIGURE 4B



AM PEAK HOUR



PM PEAK HOUR

LEGEND

490	Movement/Combined approach volume
95	Volume change from 2000 to 2005
24%	Percent change from 2000 to 2005

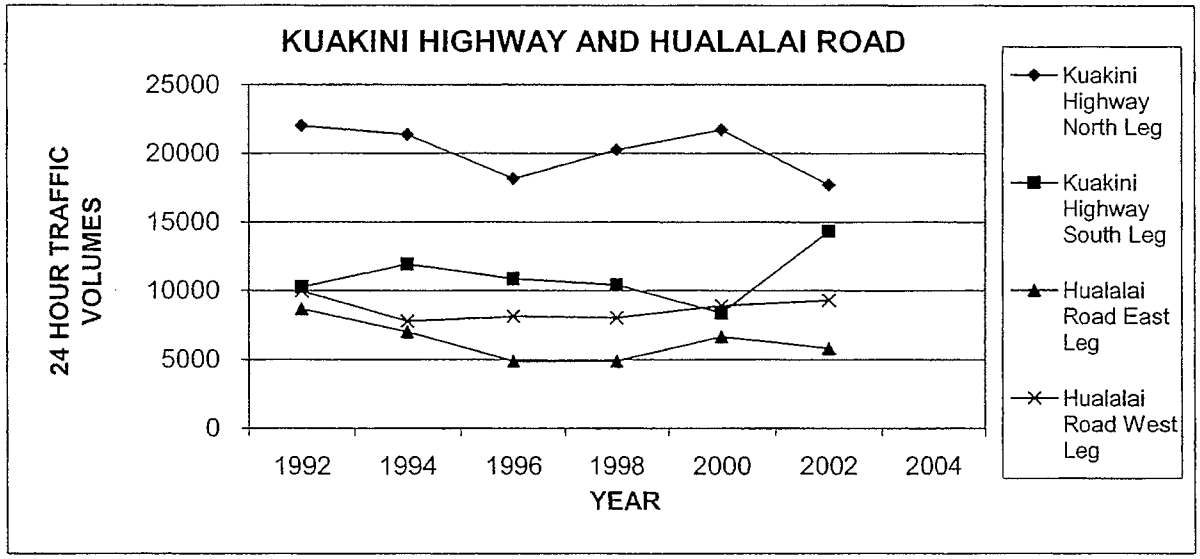
COMPARISON OF 2000 TO 2005 TRAFFIC COUNTS AT UNIVERSITY OF THE NATIONS ENTRANCE

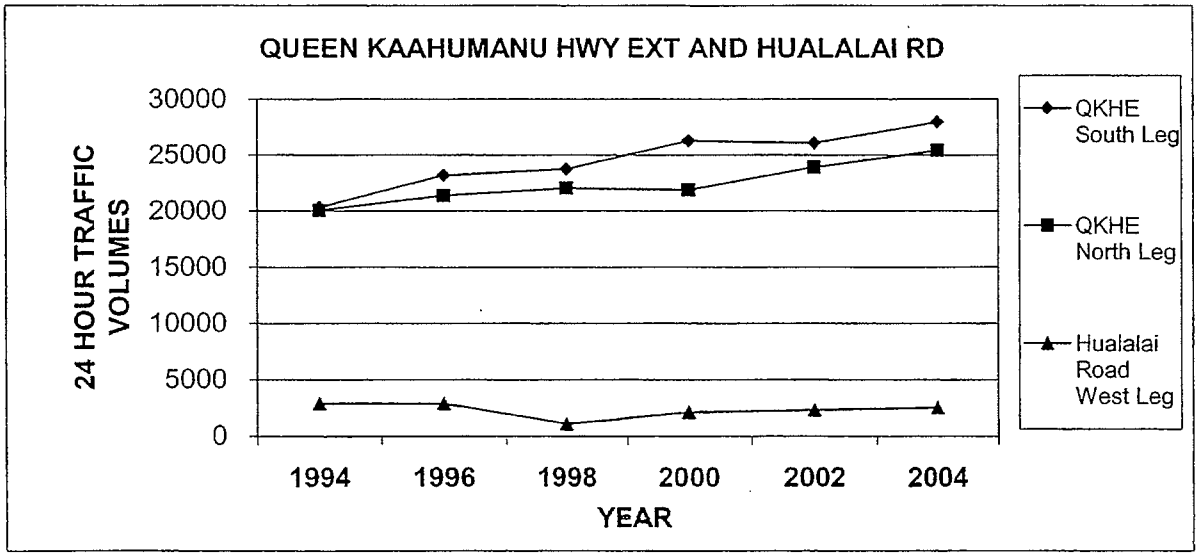
FIGURE 5

24 HOUR TWO WAY TRAFFIC VOLUMES

	STATION 8-K				STATION 9-BB			
	KUAKINI HIGHWAY		HUALALAI ROAD		HIGHWAY EXTENSION		HUALALAI ROAD	
YEAR	NORTH	SOUTH	EAST	WEST	SOUTH	NORTH	WEST	
1992	22022	10281	8660	9952				
1994	21360	11930	6996	7781	20301	20043	2874	
1996	18129	10848	4856	8105	23201	21371	2875	
1998	20254	10436	4884	8016	23732	22027	1079	
2000	21702	8345	6631	8890	26278	21887	2116	
2002	17698	14324	5794	9290	26072	23903	2317	
2004					27981	25419	2532	

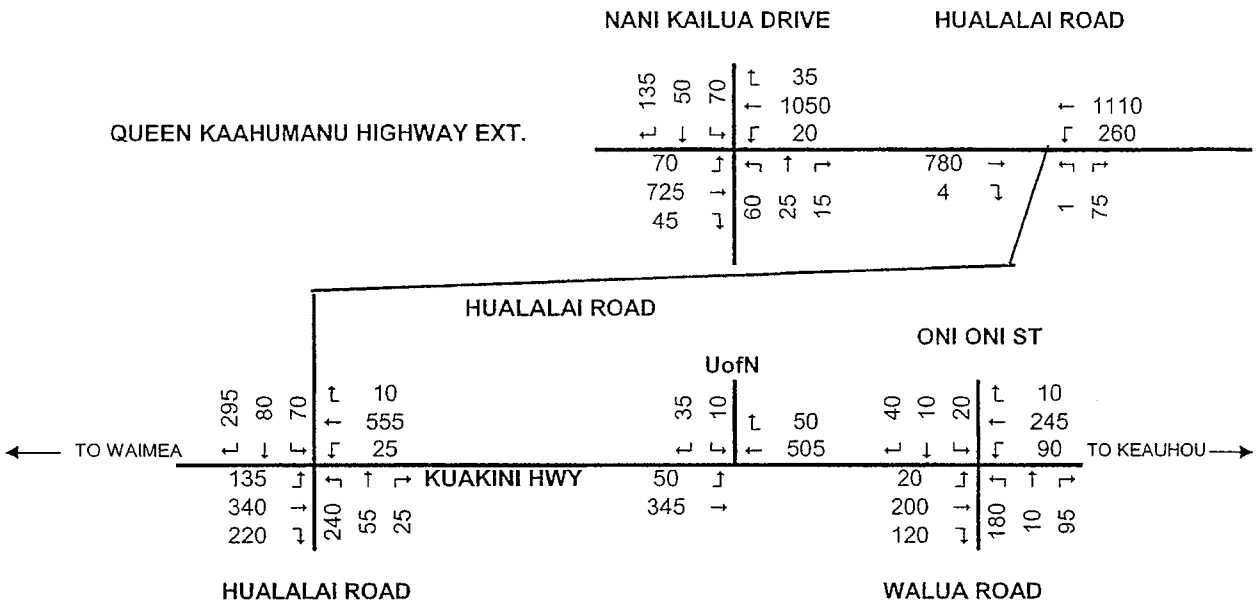
Source: State of Hawaii Department of Transportation



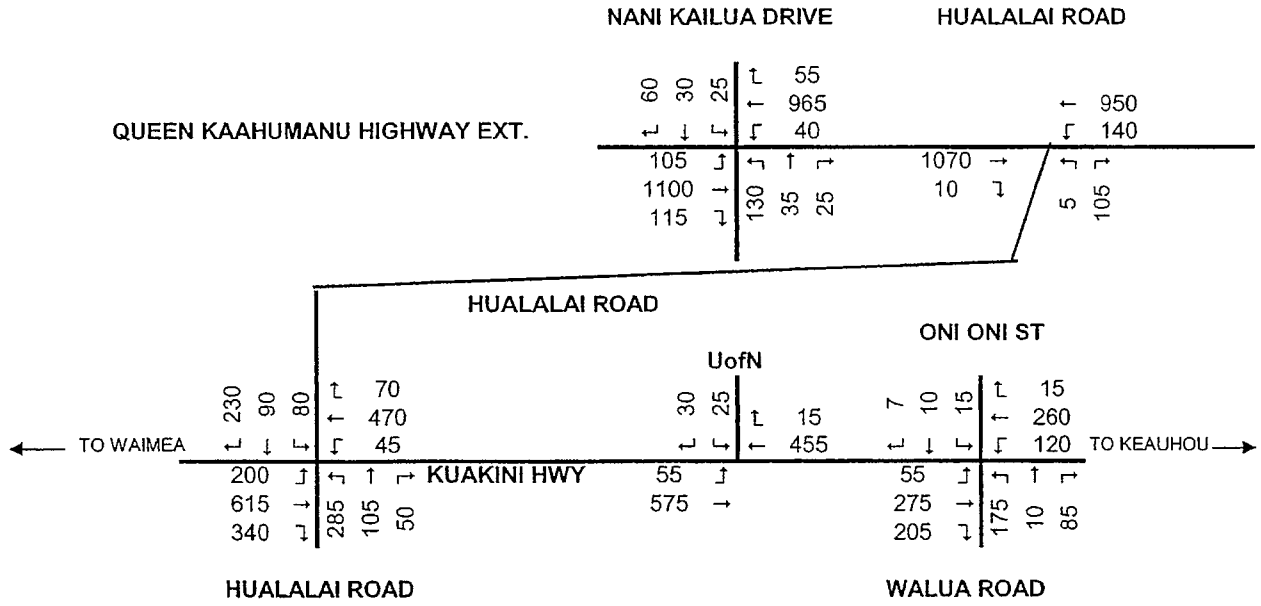


HISTORICAL TREND IN DAILY TRAFFIC VOLUMES

FIGURE 6



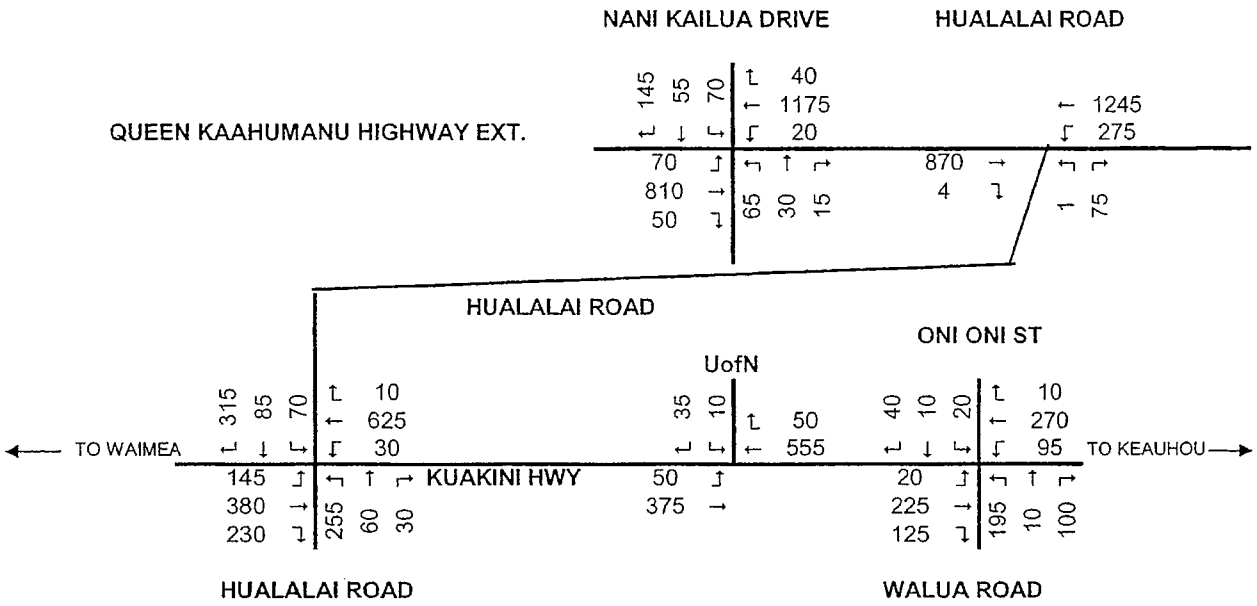
AM PEAK HOUR



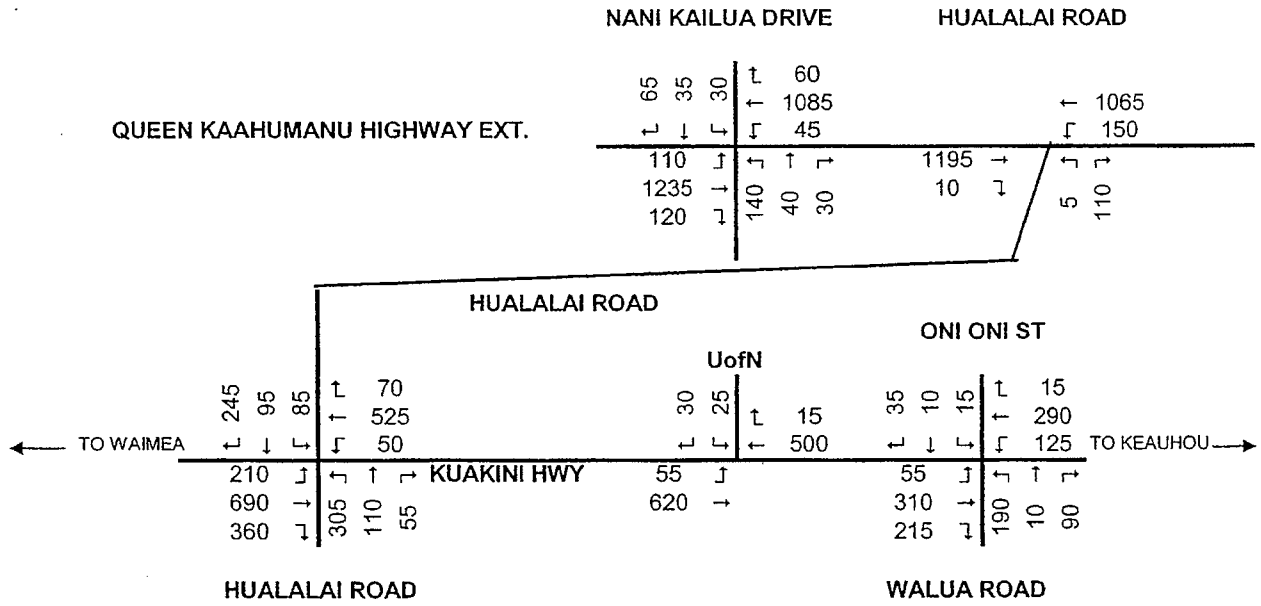
PM PEAK HOUR

Not to Scale

AMBIENT TRAFFIC FORECAST
2010 SCENARIO 1- NO HIGHWAY IMPROVEMENTS
FIGURE 7



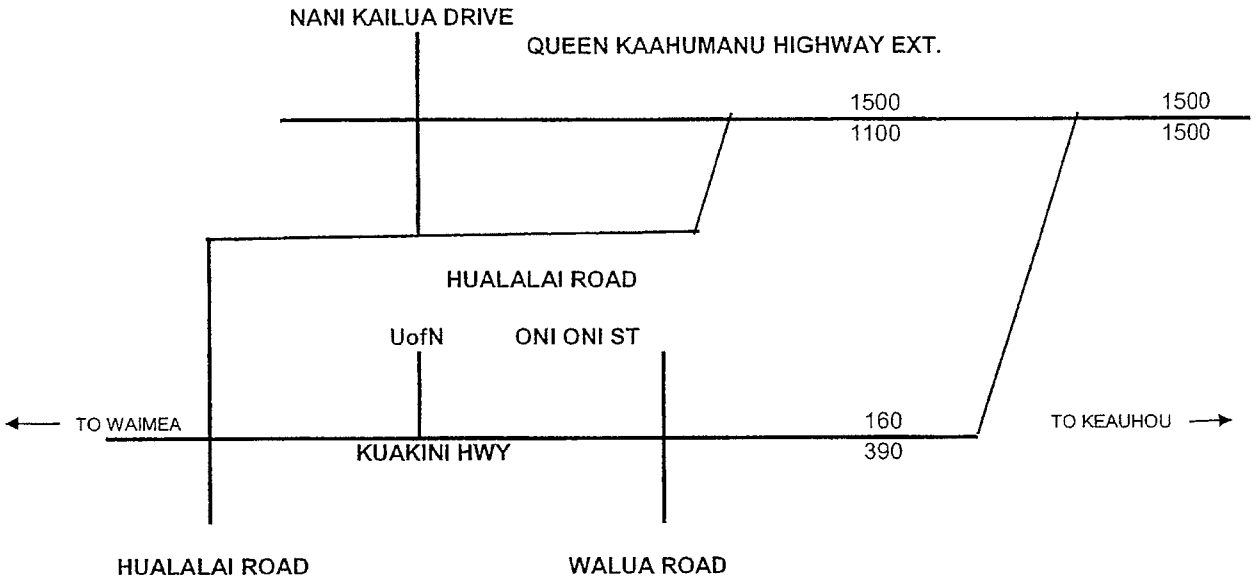
AM PEAK HOUR



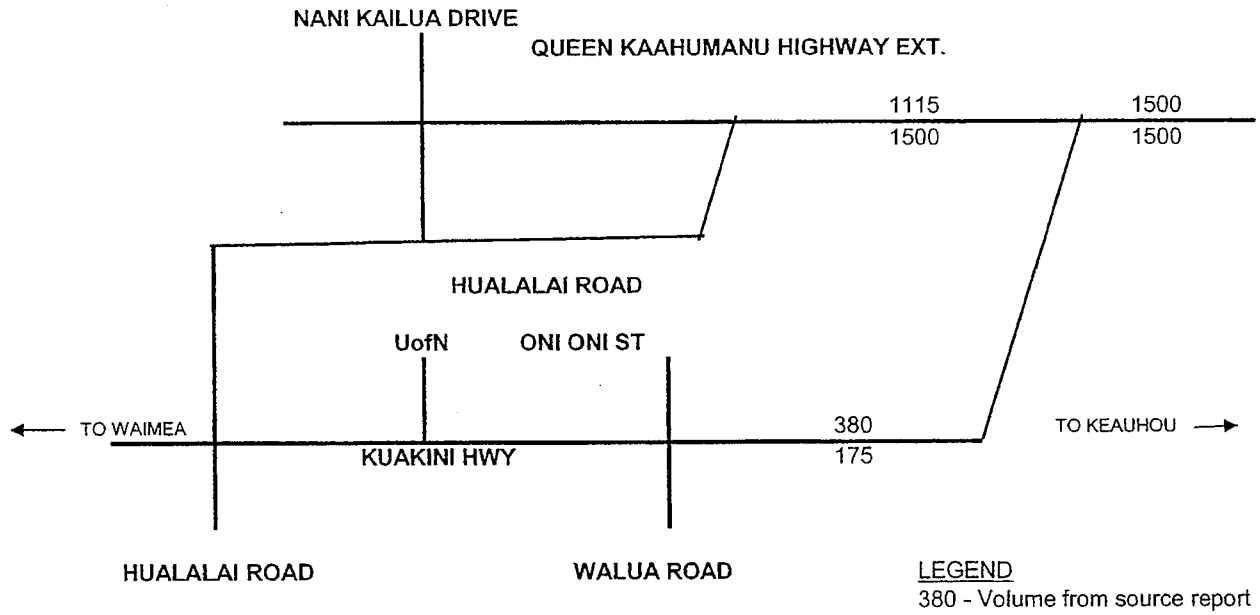
PM PEAK HOUR

Not to Scale

AMBIENT TRAFFIC FORECAST
2016 SCENARIO 1- NO HIGHWAY IMPROVEMENTS
FIGURE 8



AM PEAK HOUR

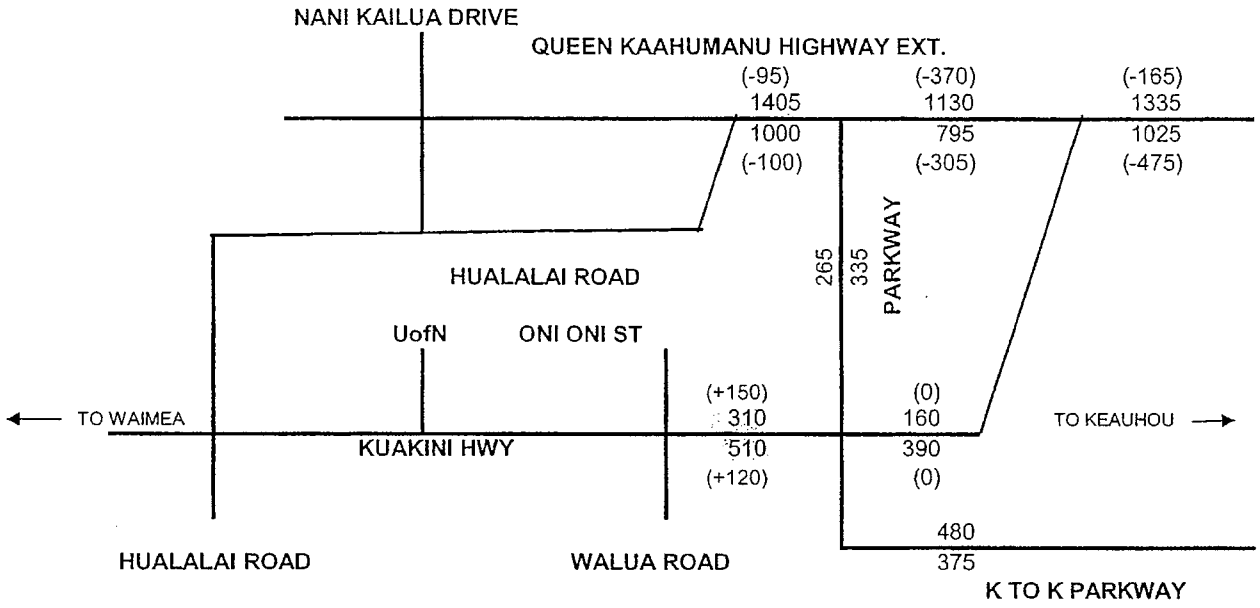


Not to Scale

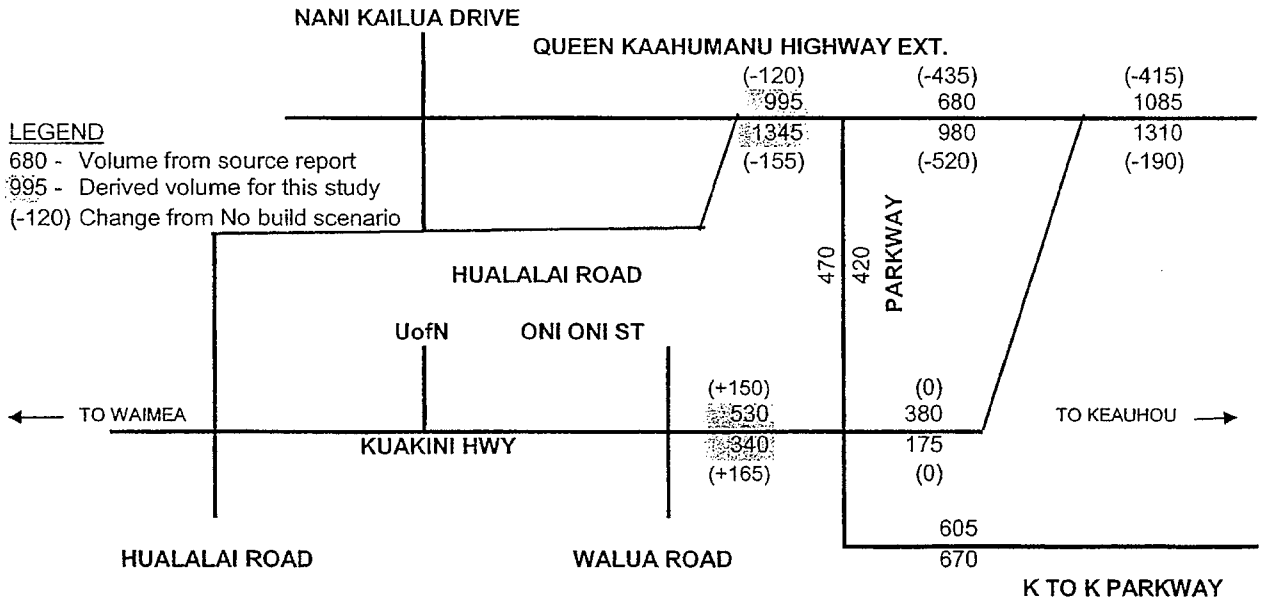
PM PEAK HOUR

Source: Kahalui to Keauhou Parkway Traffic Analysis Report (August 2000) by Julian Ng, Inc.

DERIVATION OF TRAFFIC FORECASTS FOR SCENARIO 1
2020 NO BUILD 1- NO HIGHWAY IMPROVEMENTS (EXHIBIT 3)
FIGURE 9



AM PEAK HOUR

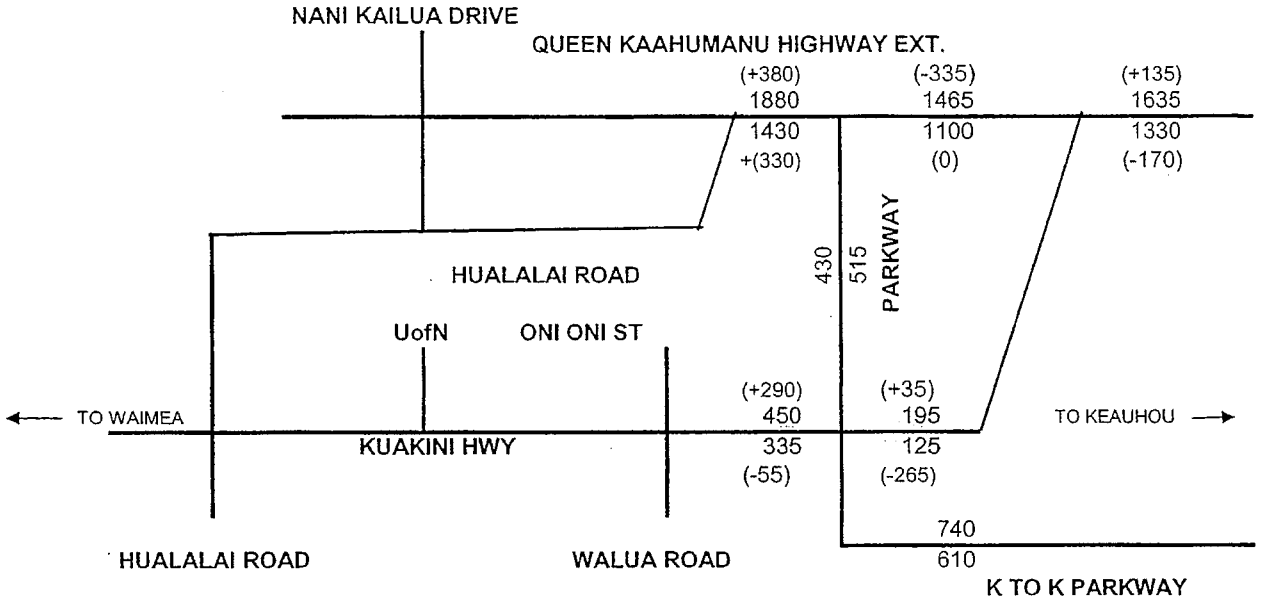


Not to Scale

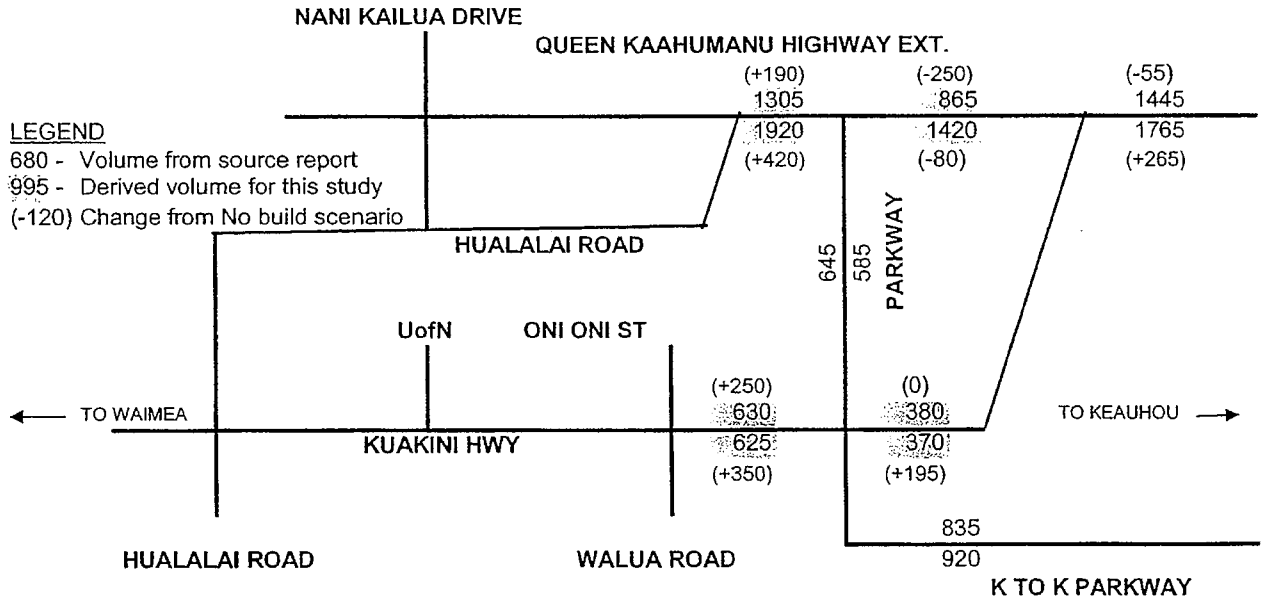
PM PEAK HOUR

Source: Kahalui to Keauhou Parkway Traffic Analysis Report (August 2000) by Julian Ng, Inc.

DERIVATION OF TRAFFIC FORECASTS FOR SCENARIO 2
2020 BUILD 1- WITH KAHALUI TO KEAUHOU PARKWAY (EXHIBIT 7)
FIGURE 10



AM PEAK HOUR

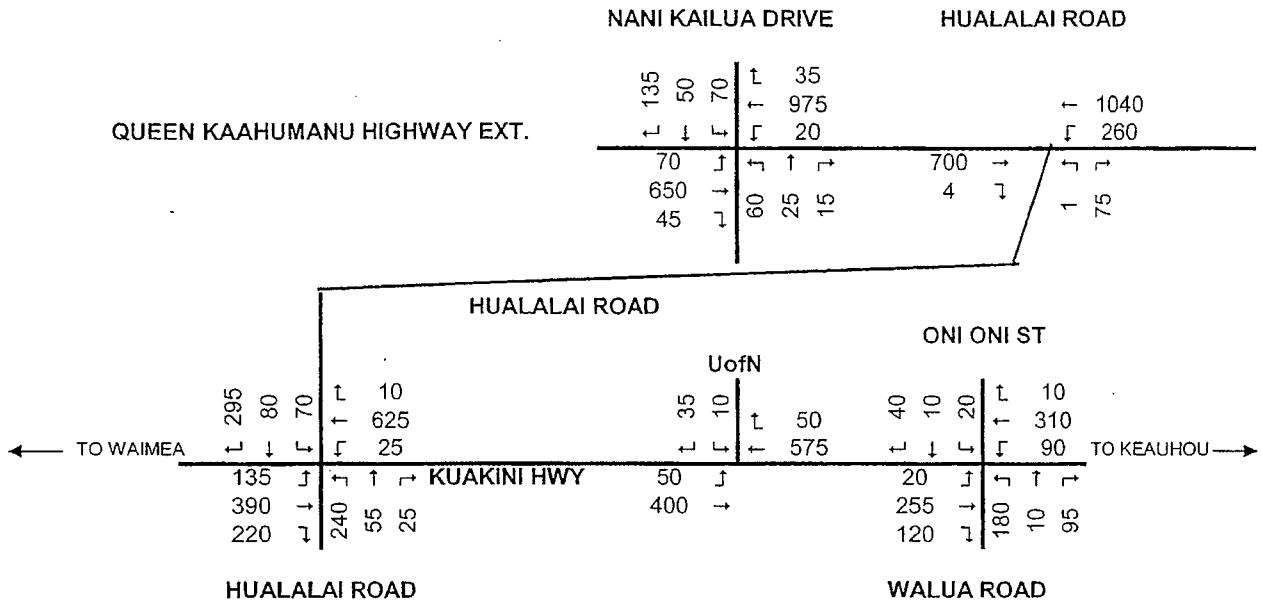


Not to Scale

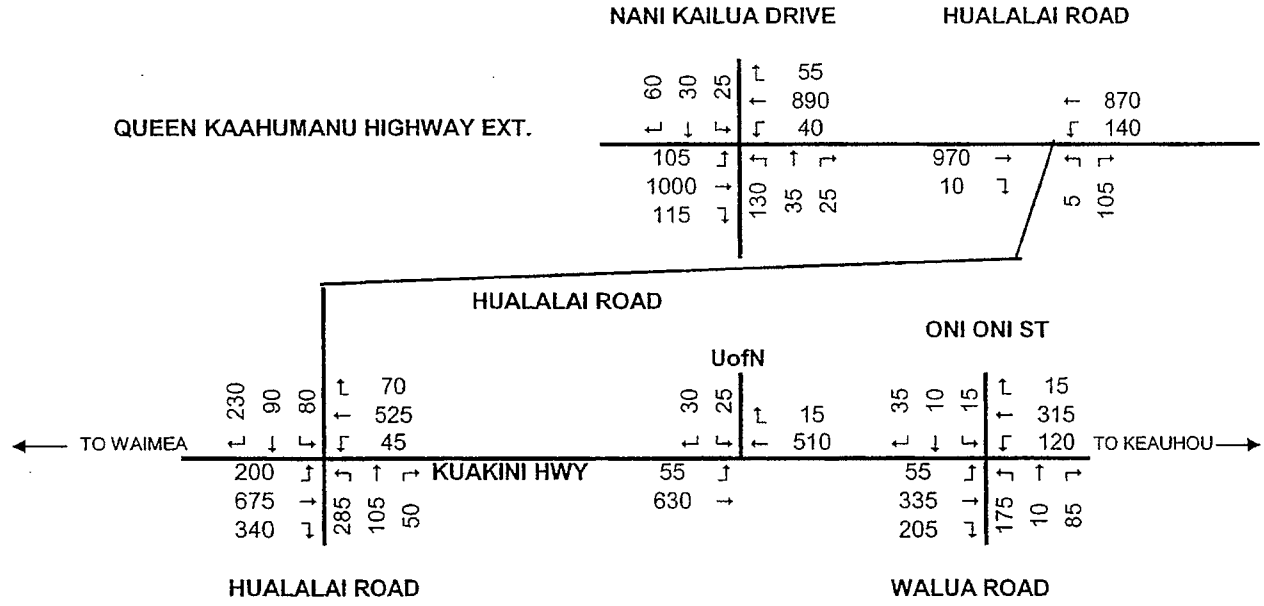
PM PEAK HOUR

Source: Kahalui to Keauhou Parkway Traffic Analysis Report (August 2000) by Julian Ng, Inc.

DERIVATION OF TRAFFIC FORECASTS FOR SCENARIO 3
2020 BUILD 2- WITH PARKWAY AND 4 LANE BELT HIGHWAY (EXHIBIT 8)
FIGURE 11



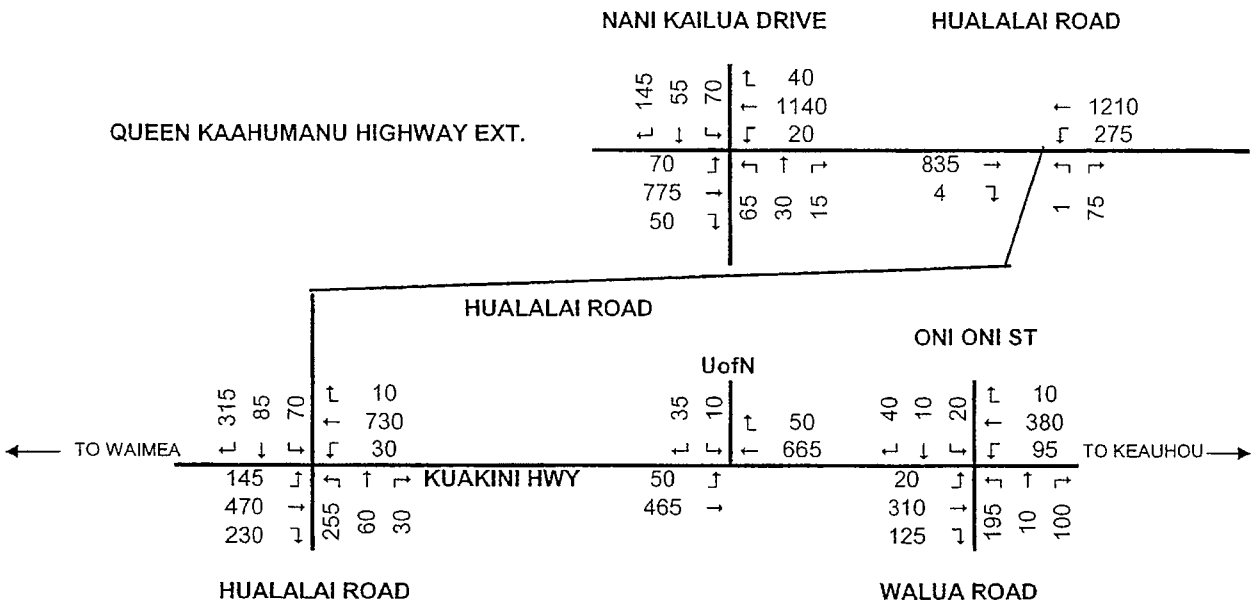
AM PEAK HOUR



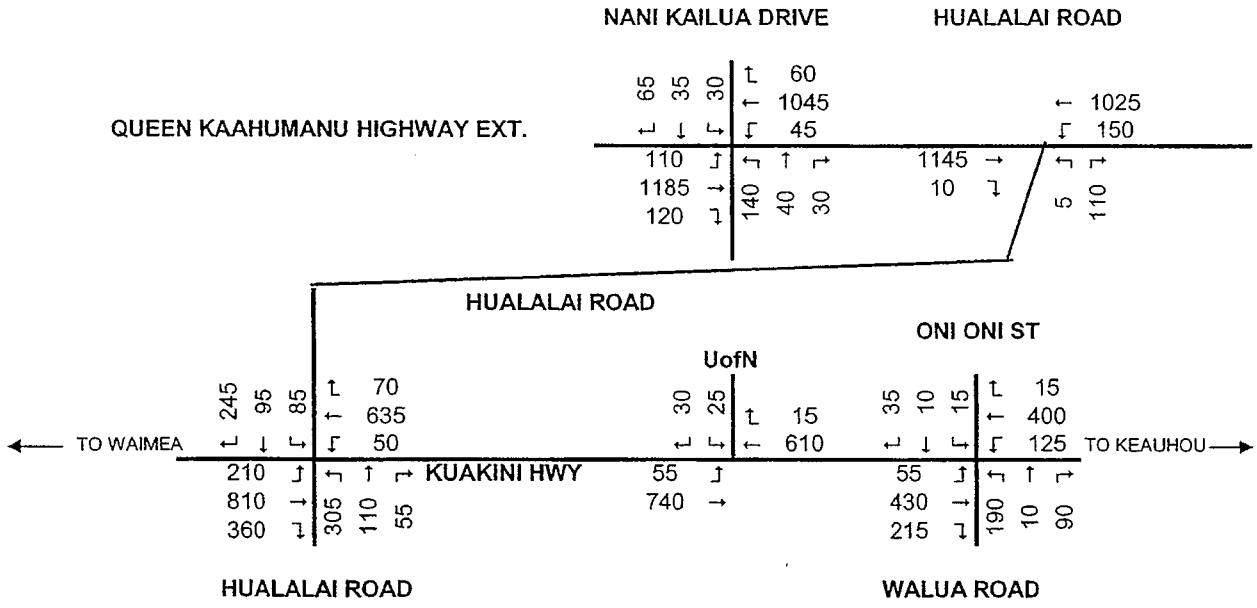
PM PEAK HOUR

Not to Scale

AMBIENT TRAFFIC FORECAST
2010 SCENARIO 2- WITH K TO K PARKWAY
FIGURE 12



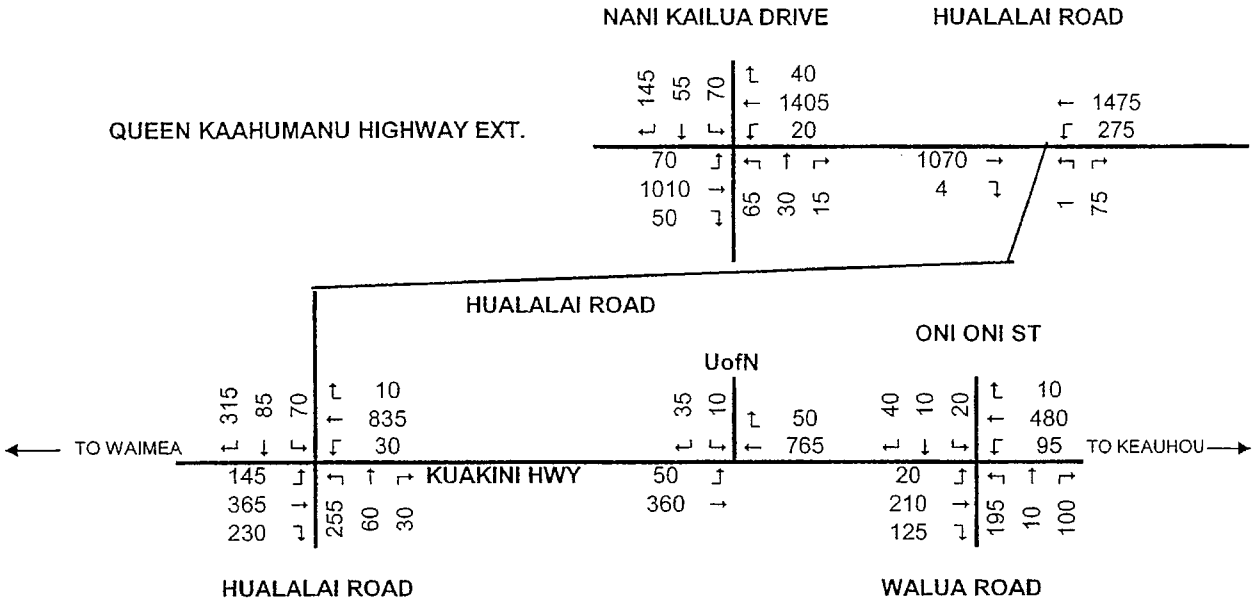
AM PEAK HOUR



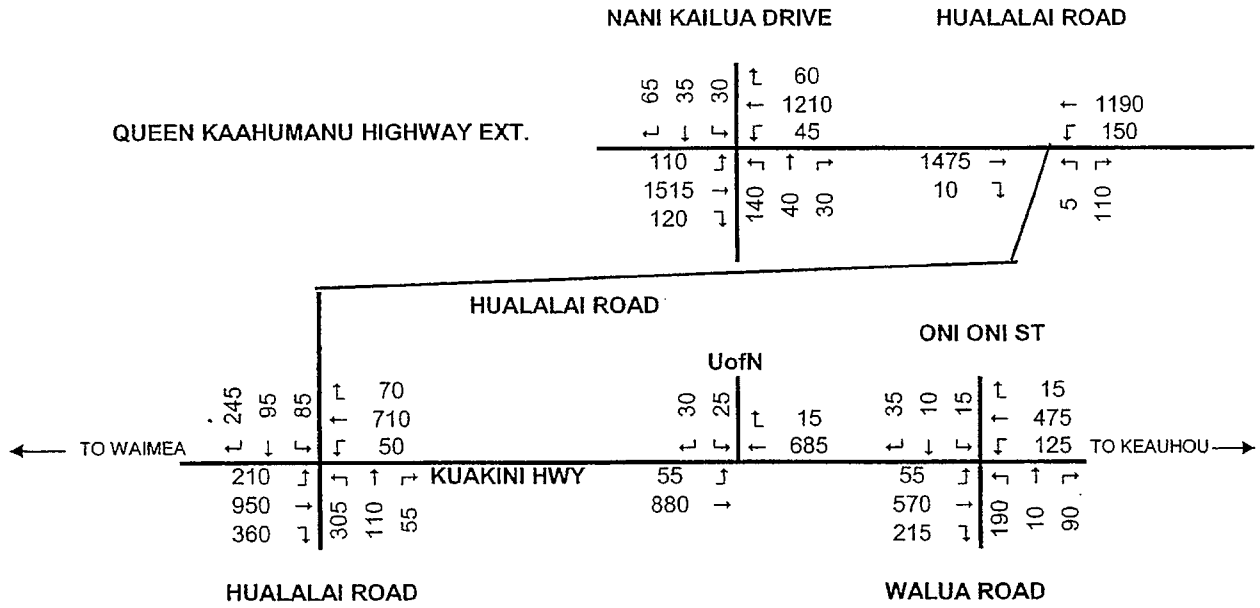
PM PEAK HOUR

Not to Scale

AMBIENT TRAFFIC FORECAST
2016 SCENARIO 2- WITH K TO K PARKWAY
FIGURE 13



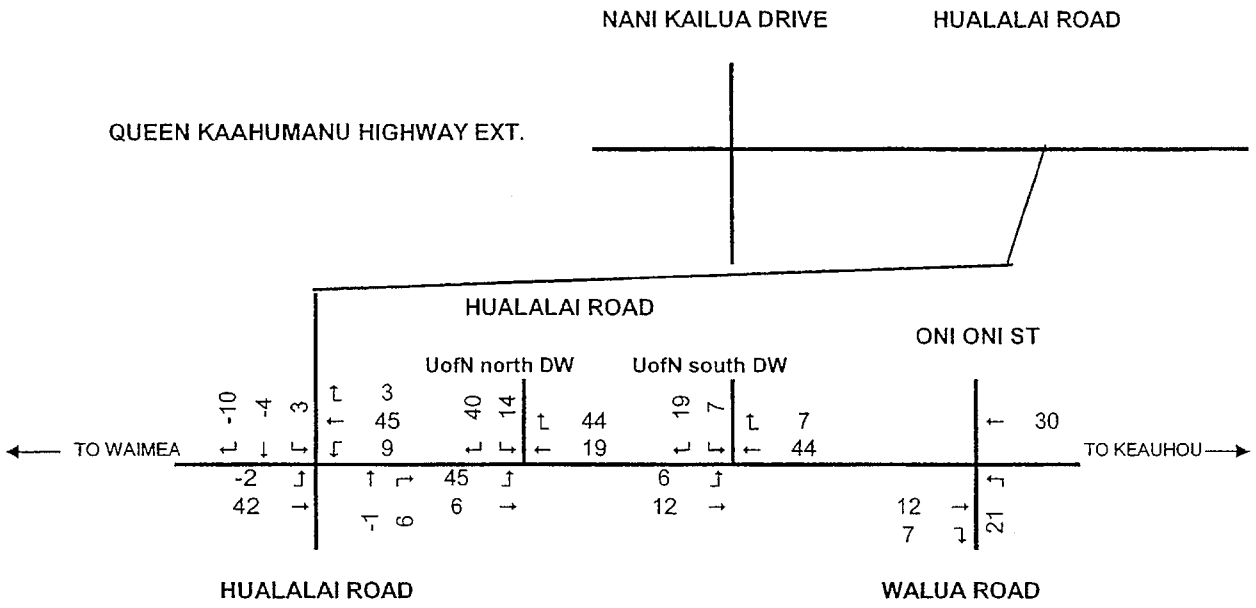
AM PEAK HOUR



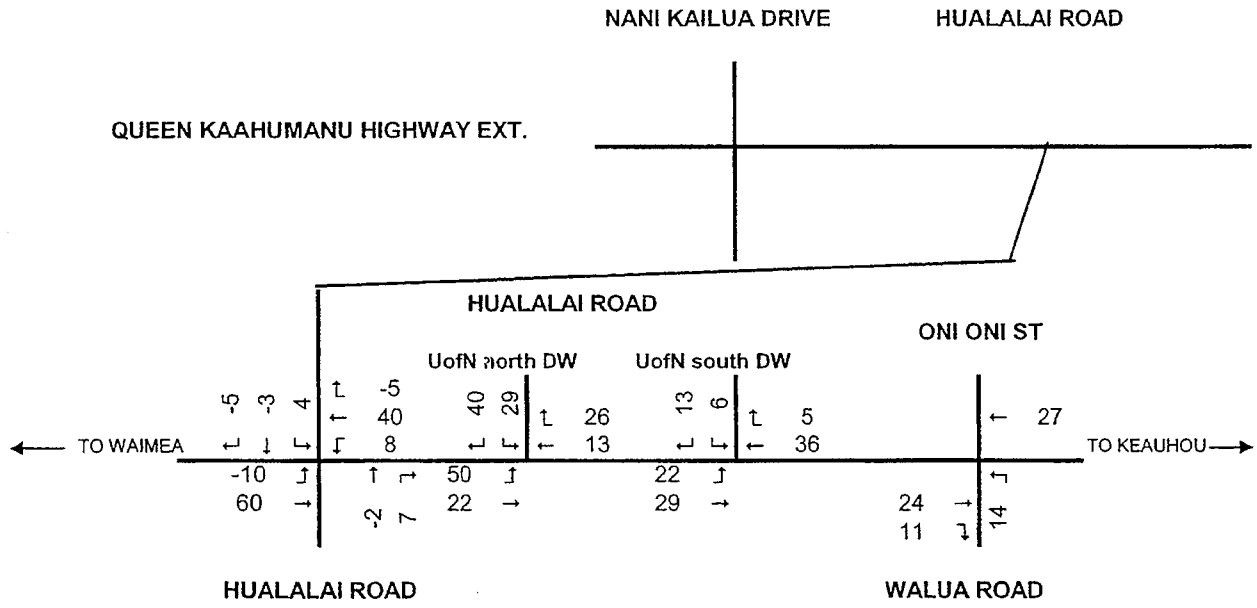
PM PEAK HOUR

Not to Scale

AMBIENT TRAFFIC FORECAST
2016 SCENARIO 3- PARKWAY & 4 LANE HI BELT HWY
FIGURE 14



AM PEAK HOUR

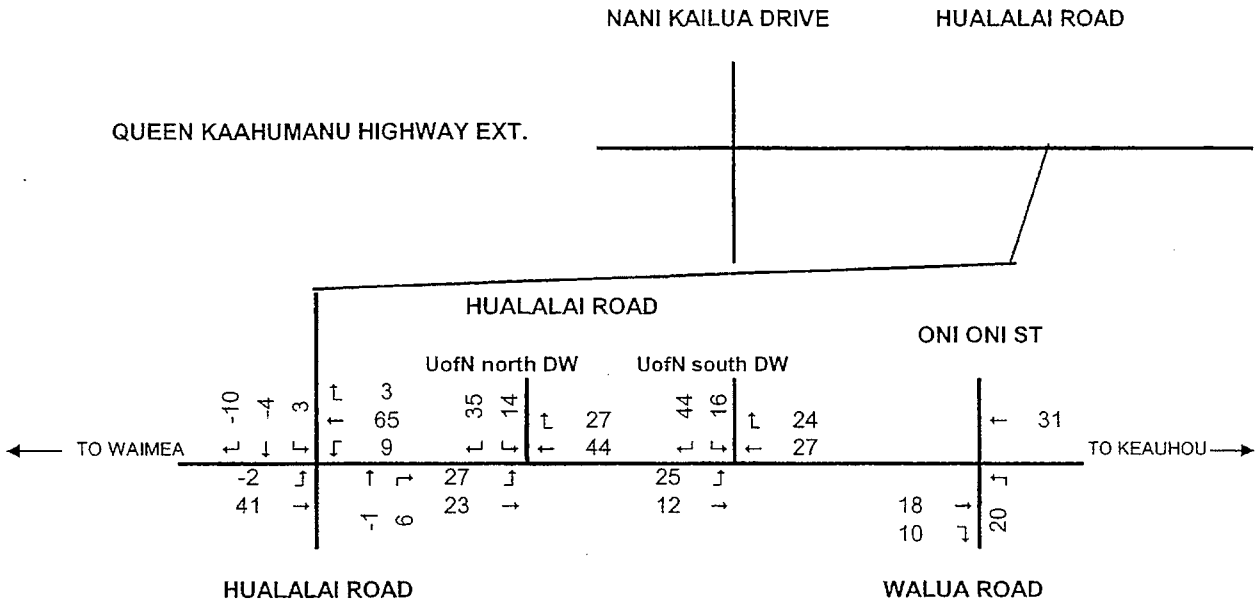


PM PEAK HOUR

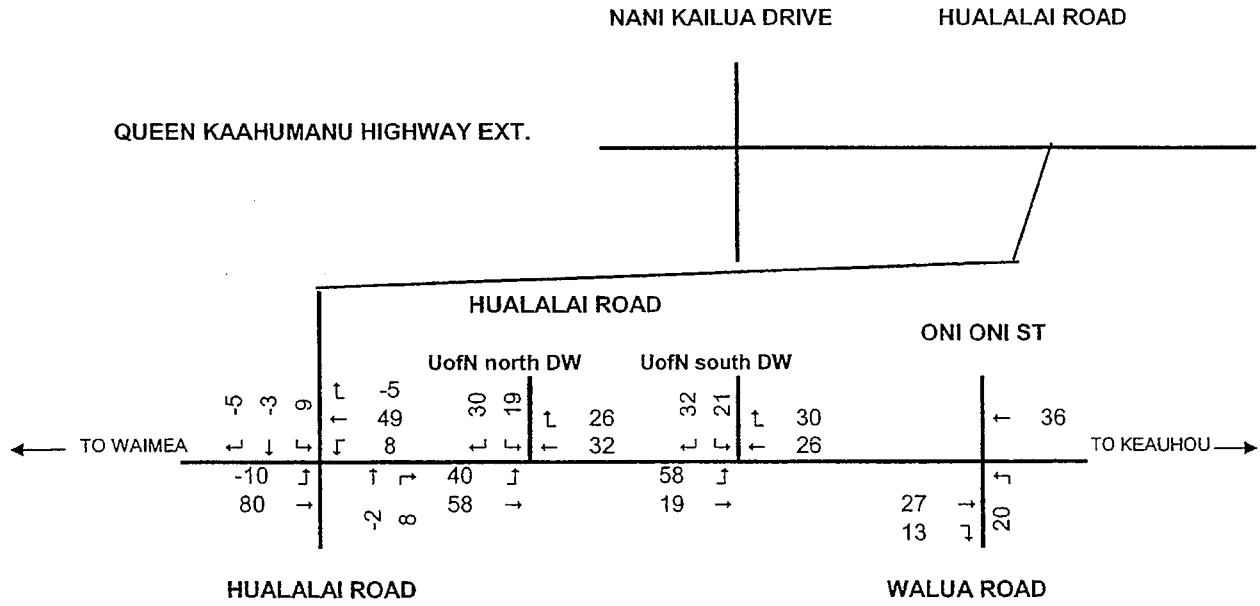
Not to Scale

2010 TRIP ASSIGNMENT FORECAST

FIGURE 15



AM PEAK HOUR

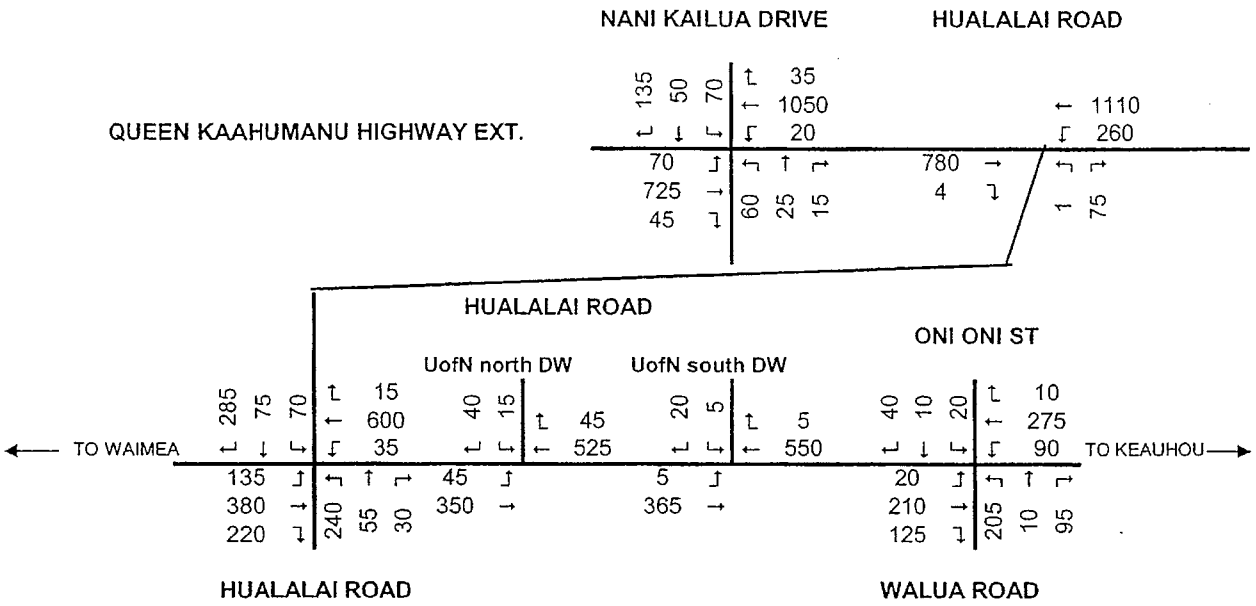


PM PEAK HOUR

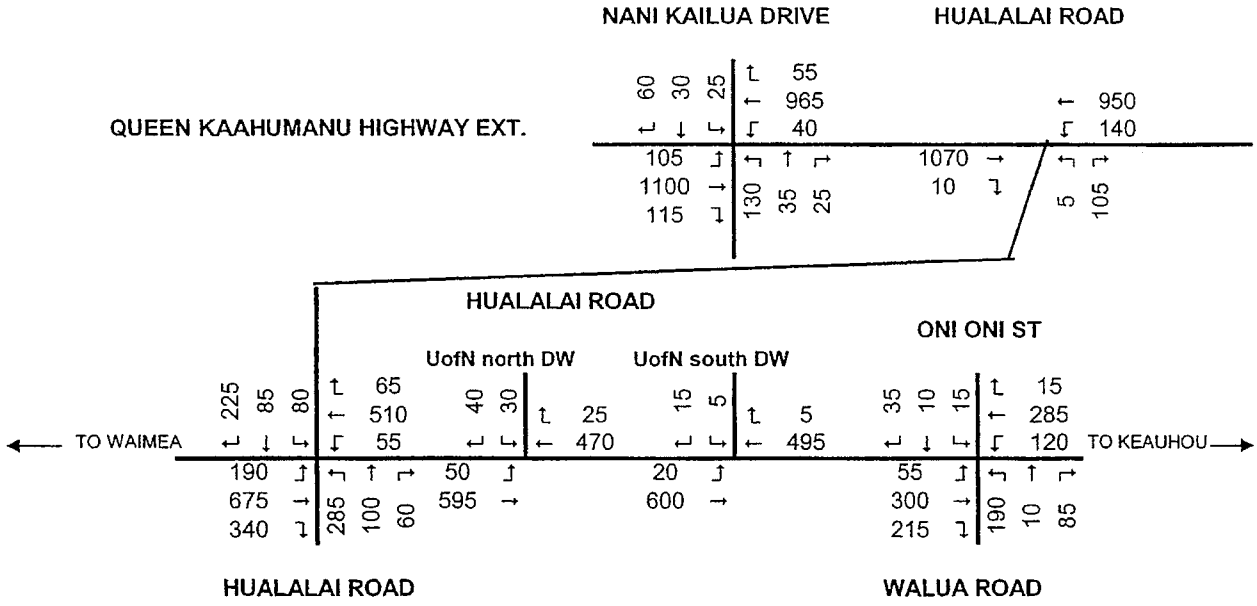
Not to Scale

2016 TRIP ASSIGNMENT FORECAST

FIGURE 16



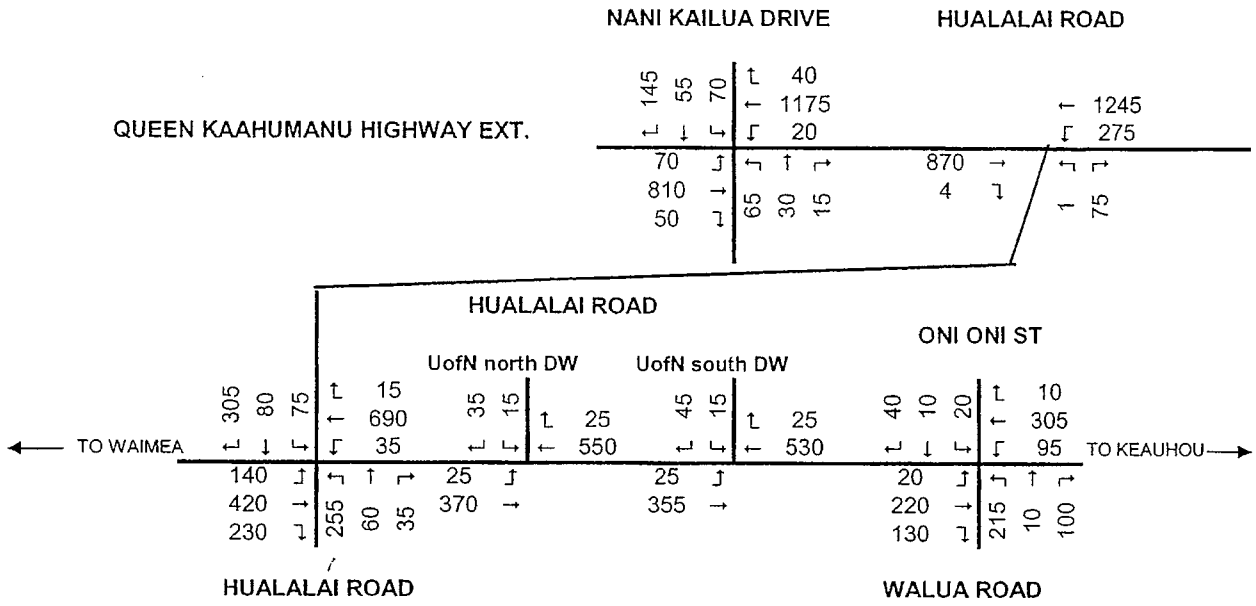
AM PEAK HOUR



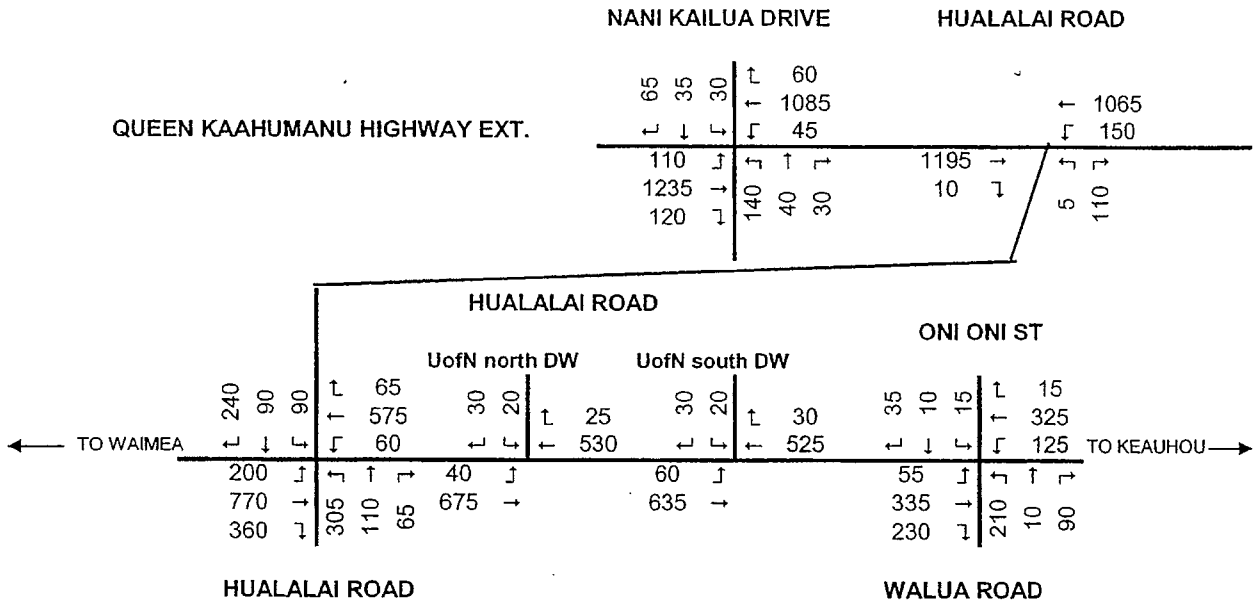
PM PEAK HOUR

Not to Scale

TOTAL TRAFFIC FORECAST
2010 SCENARIO 1- NO HIGHWAY IMPROVEMENTS
FIGURE 17



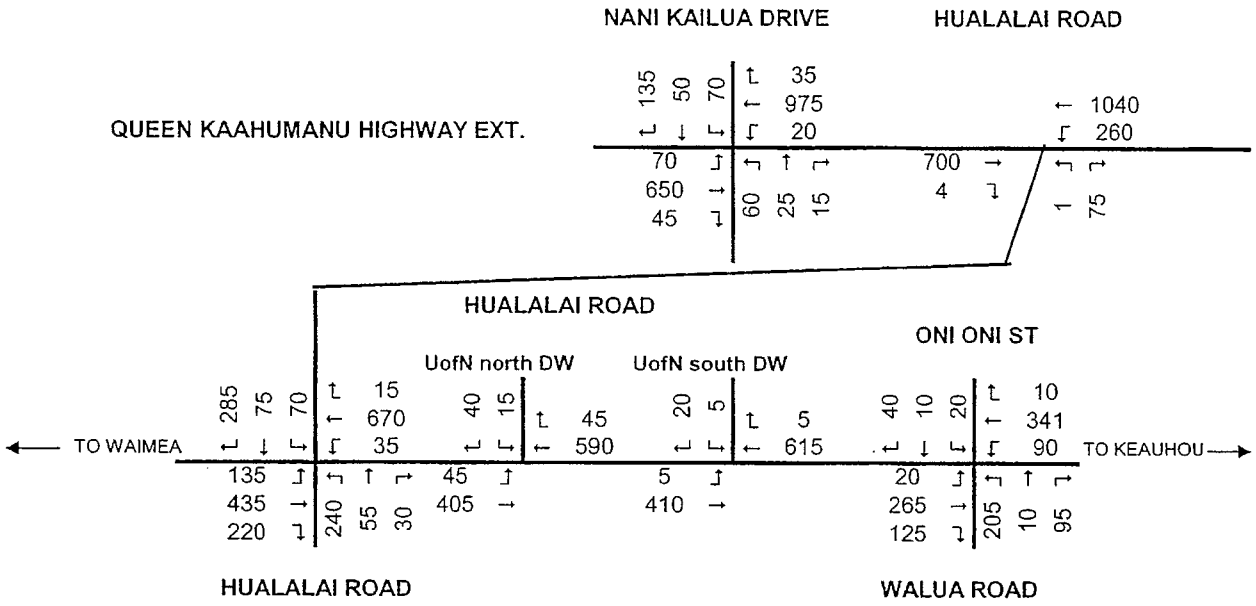
AM PEAK HOUR



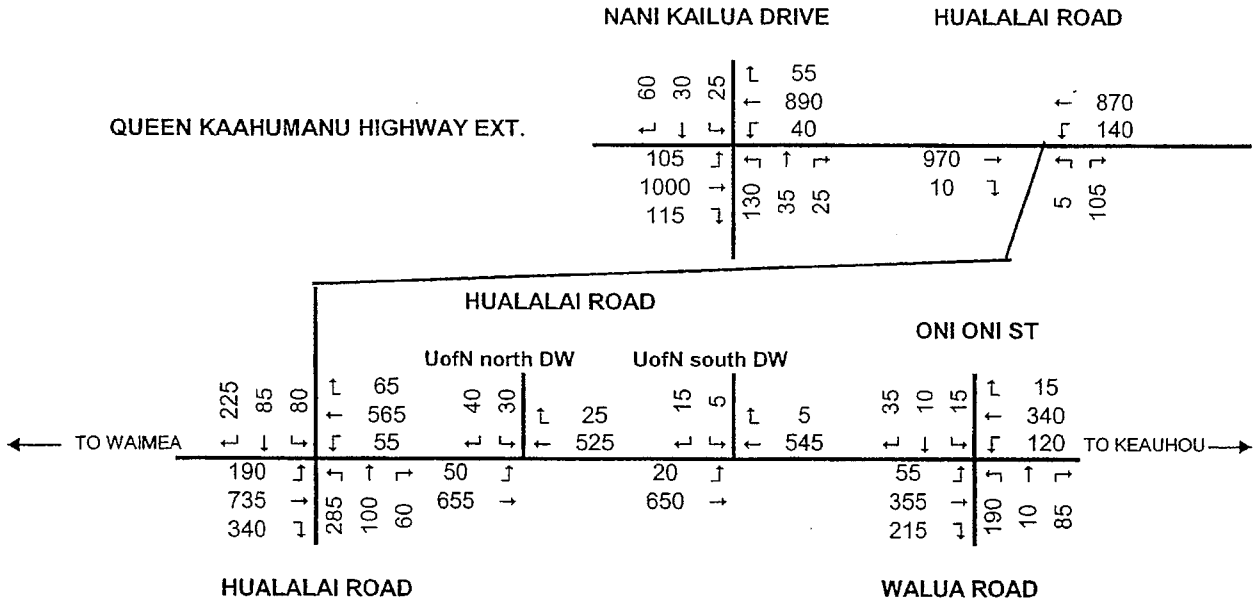
PM PEAK HOUR

Not to Scale

TOTAL TRAFFIC FORECAST
2016 SCENARIO 1- NO HIGHWAY IMPROVEMENTS
FIGURE 18



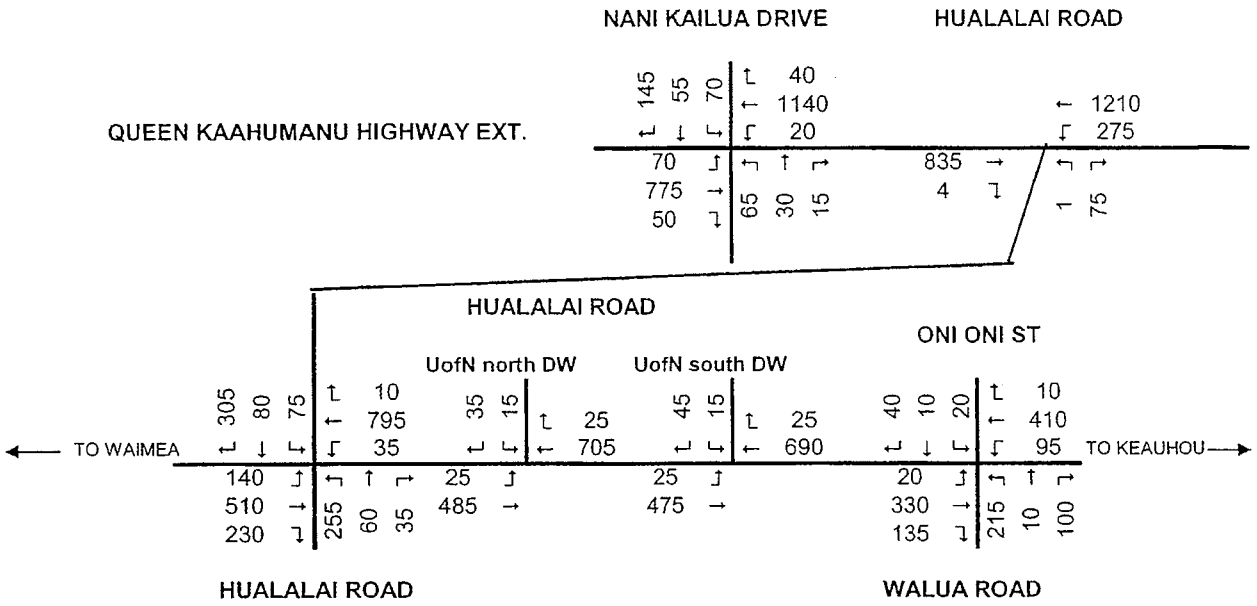
AM PEAK HOUR



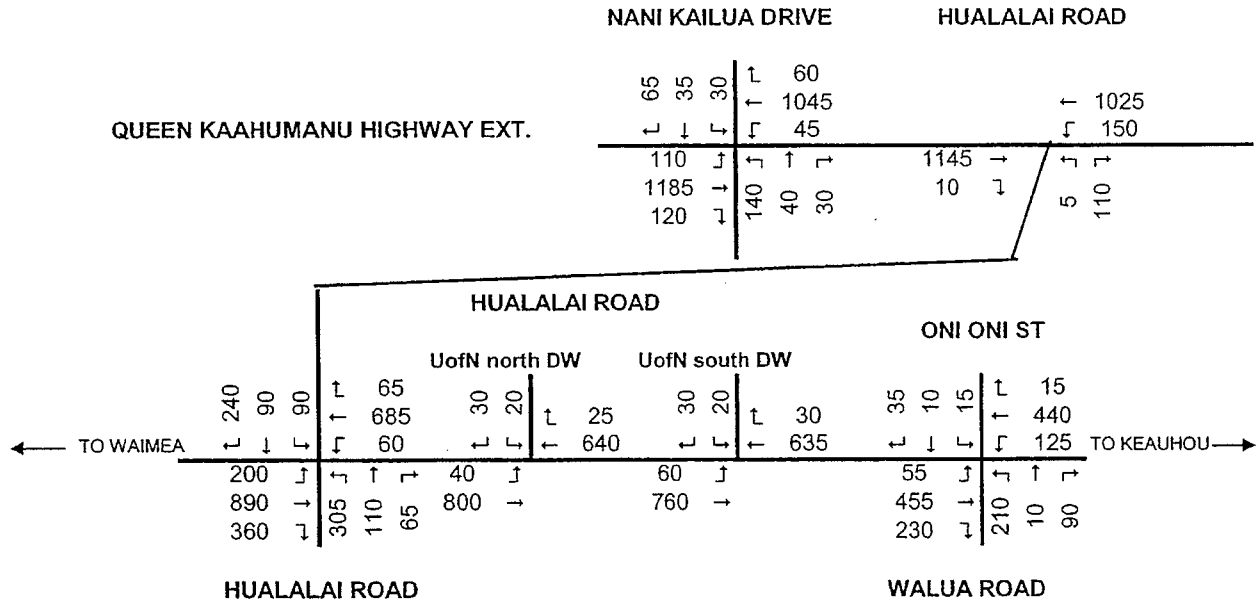
PM PEAK HOUR

Not to Scale

TOTAL TRAFFIC FORECAST
2010 SCENARIO 2- WITH K TO K PARKWAY
FIGURE 19



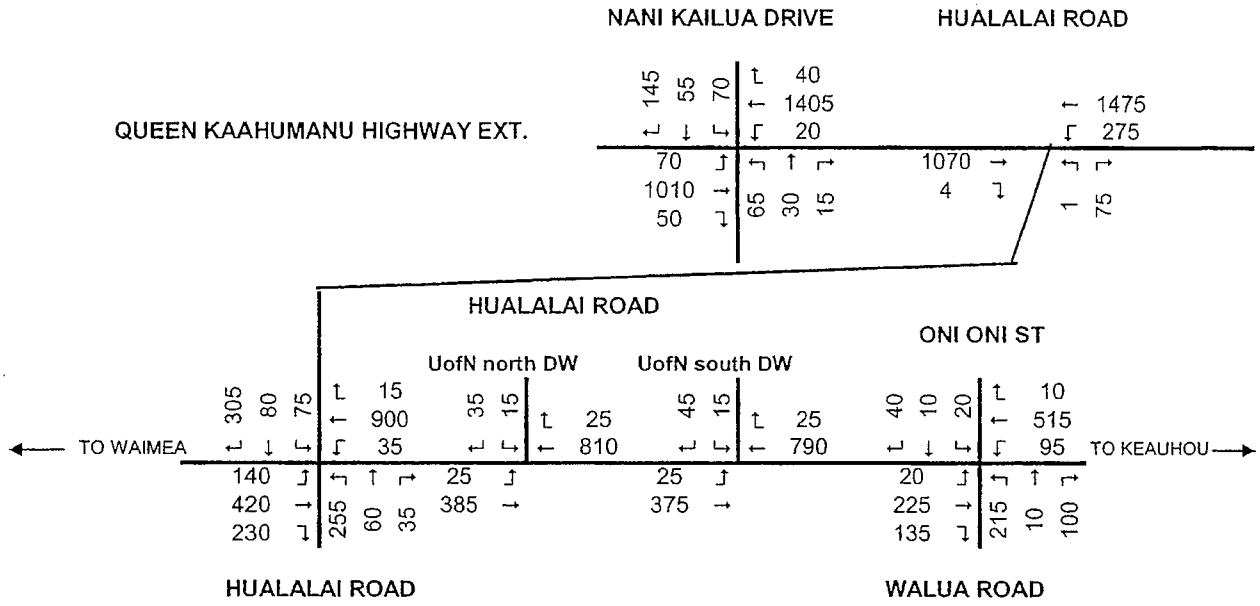
AM PEAK HOUR



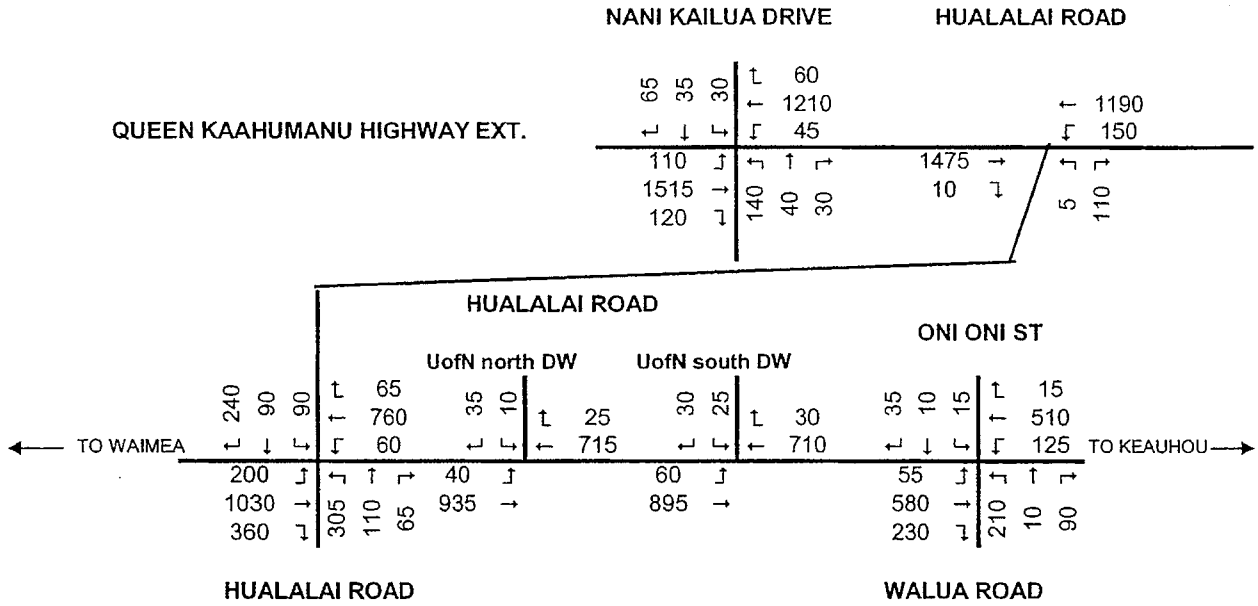
PM PEAK HOUR

Not to Scale

TOTAL TRAFFIC FORECAST
2016 SCENARIO 2- WITH K TO K PARKWAY
FIGURE 20



AM PEAK HOUR



PM PEAK HOUR

Not to Scale

TOTAL TRAFFIC FORECAST
2016 SCENARIO 3- PARKWAY & 4 LANE HI BELT HWY
FIGURE 21

Tables

TABLE 1
TRIP GENERATION AND DISTRIBUTION ANALYSIS

FORECAST YEAR TRIP COMPONENT	UNITS	AM PEAK HOUR		PM PEAK HOUR	
		INBOUND	OUTBOUND	INBOUND	OUTBOUND
2005					
TRIP GENERATION ANALYSIS					
Non-resident staff	175	60	15	25	30
Resident staff	75	10	10	25	5
Non-resident students	20	0	10	10	10
Deliveries		10	10	10	10
Total		100	45	70	55
TRIP DISTRIBUTION ANALYSIS					
North		50	35	55	30
South		50	10	15	25
2010					
TRIP GENERATION ANALYSIS					
Non-resident staff	100	45	10	15	25
Resident staff	220	45	45	65	45
Non-resident students	0	0	0	0	0
Deliveries		10	10	10	10
Total		100	65	90	80
TRIP DISTRIBUTION ANALYSIS					
North		50	45	60	45
South		50	20	30	35
2016					
TRIP GENERATION ANALYSIS					
Non-resident staff	25	10	5	5	5
Resident staff	390	75	80	115	80
Non-resident students	0	0	0	0	0
Deliveries		10	10	10	10
Total		95	95	130	95
TRIP DISTRIBUTION ANALYSIS					
North		48	65	85	55
South		47	30	45	40

TABLE 2
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

	AM PEAK HOUR					PM PEAK HOUR				
INTERSECTION	2004	2010		2016		2004	2010		2016	
Approach/Movement	EXST	AMB	TOT	AMB	TOT	EXST	AMB	TOT	AMB	TOT
QUEEN KAAHUMANU HWY/HUALALAI RD	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
Hualalai Rd EB RT	C	C	C	C	C	C	E	E	F	F
Hualalai Rd EB LT	F	F	F	F	F	F	F	F	F	F
Queen Kaahumanu Hwy NB LT	B	B	B	B	B	B	B	B	C	C
QUEEN KAAHUMANU HWY/HUALALAI RD	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
Hualalai Rd EB RT		C	C	C	C		D	D	E	E
Hualalai Rd EB LT		F	F	F	F		F	F	F	F
Queen Kaahumanu Hwy NB LT		B	B	B	B		B	B	B	B
QUEEN KAAHUMANU HWY/HUALALAI RD	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
Hualalai Rd EB RT				B	B				C	C
Hualalai Rd EB LT				F	F				F	F
Queen Kaahumanu Hwy NB LT				C	C				C	C
KUAKINI HIGHWAY/WALUA RD/ONIONI ST	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
Walua Rd EB RT	A	B	B	NA	NA	B	B	B	NA	NA
Walua Rd EB LTTH	D	F	F			D	F	F		
OniOni St WB	A	A	A			A	A	A		
Kuakini Hwy SB LT	A	A	A			A	A	A		
Kuakini Hwy NB LT	A	A	A			A	A	A		
KUAKINI HIGHWAY/WALUA RD/ONIONI ST	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
Walua Rd EB RT		B	B	NA	NA		B	B	NA	NA
Walua Rd EB LTTH		F	F				F	F		
OniOni St WB		A	A				A	A		
Kuakini Hwy SB LT		A	A				A	A		
Kuakini Hwy NB LT		A	A				A	A		
KUAKINI HIGHWAY/WALUA RD/ONIONI ST	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
Walua Rd EB RT				NA	NA				NA	NA
Walua Rd EB LTTH										
OniOni St WB										
Kuakini Hwy SB LT										
Kuakini Hwy NB LT										

TABLE 2
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

	AM PEAK HOUR					PM PEAK HOUR				
INTERSECTION	2004	2010		2016		2004	2010		2016	
Approach/Movement	EXST	AMB	TOT	AMB	TOT	EXST	AMB	TOT	AMB	TOT
KUAKINI HWY/UOFN NORTH DRIVEWAY	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
UofN WB driveway	B	B	B	C	B	B	C	C	C	C
Kuakini Hwy SB LT	A	A	A	A	A	A	A	A	A	A
KUAKINI HWY/UOFN NORTH DRIVEWAY	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
UofN WB driveway		C	C	C	C		C	C	C	C
Kuakini Hwy SB LT		A	A	A	A		A	A	A	A
KUAKINI HWY/UOFN NORTH DRIVEWAY	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
UofN WB driveway				C	C				D	E
Kuakini Hwy SB LT				B	B				A	A
KUAKINI HWY/UOFN SOUTH DRIVEWAY	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
UofN WB driveway			B		B			C		D
Kuakini Hwy SB LT			A		A			A		A
KUAKINI HWY/UOFN SOUTH DRIVEWAY	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
UofN WB driveway			C		C			C		C
Kuakini Hwy SB LT			A		A			A		A
KUAKINI HWY/UOFN SOUTH DRIVEWAY	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
UofN WB driveway					C					E
Kuakini Hwy SB LT					A					A

Delay measured in seconds/vehicle

LEGEND

NB = northbound
SB = southbound
EB = eastbound
WB = westbound
LT = left turn
RT = right turn
TH = through movement

EXST = Existing traffic conditions
AMB = Ambient traffic forecast conditions
TOT = Total with project traffic forecast conditions
NA = Not appropriate since unsignalized conditions are infeasible

TABLE 3
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

	AM PEAK HOUR					PM PEAK HOUR				
INTERSECTION	2004	2010		2016		2004	2010		2016	
Approach/Movement	EXST	AMB	TOT	AMB	TOT	EXST	AMB	TOT	AMB	TOT
	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
KUAKINI HWY/HUALALAI RD	C	C	C	C	C	C	C	C	C	D
Hualalai Rd EB	B	C	C	C	C	C	C	D	D	D
Hualalai Rd WB	D	C	C	C	C	C	C	D	D	D
Kuakini Hwy NB	C	B	B	B	C	B	C	C	C	C
Kuakini Hwy SB	B	B	B	B	C	B	C	C	C	D
	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
KUAKINI HWY/HUALALAI RD		C	C	C	C		C	C	D	D
Hualalai Rd EB		C	C	C	C		C	D	D	E
Hualalai Rd WB		C	C	C	C		D	D	D	E
Kuakini Hwy NB		B	C	C	C		C	C	C	C
Kuakini Hwy SB		B	C	C	C		C	C	D	D
	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
KUAKINI HWY/HUALALAI RD				C	C				E	E
Hualalai Rd EB				C	C				E	F
Hualalai Rd WB				C	C				E	F
Kuakini Hwy NB				C	C				D	C
Kuakini Hwy SB				C	C				E	E
	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
QUEEN KAAHUMANU HWY/NANI KAILUA DR	C	C	C	D	D	C	D	D	E	E
Nani Kailua Dr EB	D	D	D	F	F	C	D	D	F	F
Nani Kailua Dr WB	D	D	D	F	F	C	D	D	F	F
Queen Kaahumanu Hwy NB	C	C	C	C	C	B	D	D	C	C
Queen Kaahumanu Hwy SB	B	B	B	B	B	C	D	D	C	C
	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
QUEEN KAAHUMANU HWY/NANI KAILUA DR		C	C	D	D		C	C	E	E
Nani Kailua Dr EB		D	D	F	F		D	D	F	F
Nani Kailua Dr WB		D	D	F	F		D	D	F	F
Queen Kaahumanu Hwy NB		C	C	C	C		C	C	C	C
Queen Kaahumanu Hwy SB		B	B	B	B		C	C	C	C
	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
QUEEN KAAHUMANU HWY/NANI KAILUA DR				C	C				C	C
Nani Kailua Dr EB				D	D				D	D
Nani Kailua Dr WB				D	D				D	D
Queen Kaahumanu Hwy NB				B	B				C	C
Queen Kaahumanu Hwy SB				B	B				B	B

TABLE 3
SIGNALIZED INTERSECTION LEVEL OF SERVICE ANALYSIS

	AM PEAK HOUR					PM PEAK HOUR				
INTERSECTION	2004	2010		2016		2004	2010		2016	
Approach/Movement	EXST	AMB	TOT	AMB	TOT	EXST	AMB	TOT	AMB	TOT
	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
KUAKINI HWY/WALUA RD/ONIONI ST		B	B	B	B		B	B	B	B
Walua Rd EB		D	D	D	D		D	D	D	D
OniOni St WB		C	C	C	C		C	C	C	C
Kuakini Hwy NB		A	A	A	B		A	A	A	B
Kuakini Hwy SB		B	B	B	B		B	B	B	B
	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
KUAKINI HWY/WALUA RD/ONIONI ST		B	B	B	C		B	B	B	C
Walua Rd EB		D	D	D	D		D	D	D	D
OniOni St WB		C	C	C	C		C	C	C	C
Kuakini Hwy NB		A	B	B	B		B	B	B	B
Kuakini Hwy SB		B	B	B	B		B	B	B	B
	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
KUAKINI HWY/WALUA RD/ONIONI ST				B	C				C	C
Walua Rd EB				D	D				D	D
OniOni St WB				C	C				C	C
Kuakini Hwy NB				B	B				B	B
Kuakini Hwy SB				B	B				C	C
	(SCENARIO 1, NO HIGHWAY IMPROVMENTS)									
QUEEN KAAHUMANU HWY/HUALALAI RD		C	C	C	C		C	C	D	D
Hualalai Rd EB		C	C	D	D		D	D	E	E
Queen Kaahumanu Hwy NB		C	C	C	C		B	B	C	C
Queen Kaahumanu Hwy NB LT		C	C	B	B		B	B	B	B
Queen Kaahumanu Hwy SB		C	C	C	C		D	D	D	D
	(SCENARIO 2, WITH KAHALUU TO KEAUHOU PARKWAY)									
QUEEN KAAHUMANU HWY/HUALALAI RD		B	B	C	C		B	B	C	C
Hualalai Rd EB		C	C	D	D		D	D	E	E
Queen Kaahumanu Hwy NB		B	B	C	C		A	A	B	B
Queen Kaahumanu Hwy NB LT		B	B	B	B		A	A	B	B
Queen Kaahumanu Hwy SB		B	B	B	B		C	C	C	C
	(SCENARIO 3, WITH PARKWAY AND 4 LANE HI BELT RD)									
QUEEN KAAHUMANU HWY/HUALALAI RD				B	B				B	B
Hualalai Rd EB				D	D				D	D
Queen Kaahumanu Hwy NB				B	B				B	B
Queen Kaahumanu Hwy NB LT				C	C				D	D
Queen Kaahumanu Hwy SB				C	C				C	C

Delay measured in seconds/vehicle

LEGEND

NB = northbound
SB = southbound
EB = eastbound
WB = westbound
LT = left turn

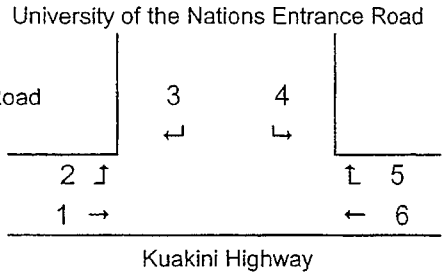
EXST = Existing traffic conditions
AMB = Ambient traffic forecast conditions
TOT = Total with project traffic forecast conditions

Appendix A

Traffic Turning Movement Counts

TRAFFIC TURNING MOVEMENT COUNT
UNIVERSITY OF THE NATIONS

LOCATION: Kuakini Highway/University of the Nations Access Road
DATE: January 13, 2005, Thursday
TIME: 6:30a.m.-8:30a.m./3:30p.m.-5:30p.m.
WEATHER: Sunshine, Mixed with Few Clouds
RECORDER: Thomas Lemanski

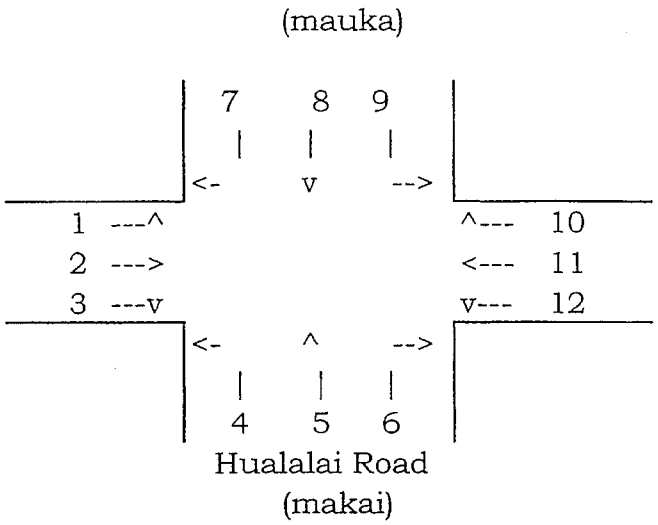


TIME	MOVEMENT NUMBER						
PERIOD	1	2	3	4	5	6	TOTAL
6:30-6:45a	20	3	3	0	3	43	72
6:45-7:00a	45	6	3	2	2	56	114
7:00-7:15a	37	5	5	1	3	77	128
7:15-7:30a	42	4	2	0	3	79	130
7:30-7:45a	65	16	5	1	8	95	190
7:45-8:00a	72	12	8	2	22	131	247
8:00-8:15a	68	10	14	5	14	117	228
8:15-8:30a	66	10	8	2	6	80	172
6:30-8:30a	415	66	48	13	61	678	1281
7:30-8:30a	271	48	35	10	50	423	444
PHF	0.95				0.77		

TIME	MOVEMENT NUMBER						
PERIOD	1	2	3	4	5	6	TOTAL
3:30-3:45p	115	8	13	2	3	89	230
3:45-4:00p	128	8	7	5	3	104	255
4:00-4:15p	103	3	4	6	2	77	195
4:15-4:30p	99	11	3	1	6	80	200
4:30-4:45p	130	12	7	7	3	93	252
4:45-5:00p	110	14	11	13	5	74	227
5:00-5:15p	117	19	8	4	2	84	234
5:15-5:30p	70	13	10	8	2	53	156
3:30p-5:30p	872	88	63	46	26	654	1749
4:15p-5:15p	456	56	29	25	16	331	913
PHF	0.98				0.90		

TRAFFIC TURNING MOVEMENT COUNT

LOCATION: Kuakini Hwy/Hualalai Rd
DATE: April 8, 2004, Thursday
TIME: 6:30a-8:30a/3:30p-5:30p
WEATHER: partly cloudy
RECORDER: R. Alberts, T. Lemanski

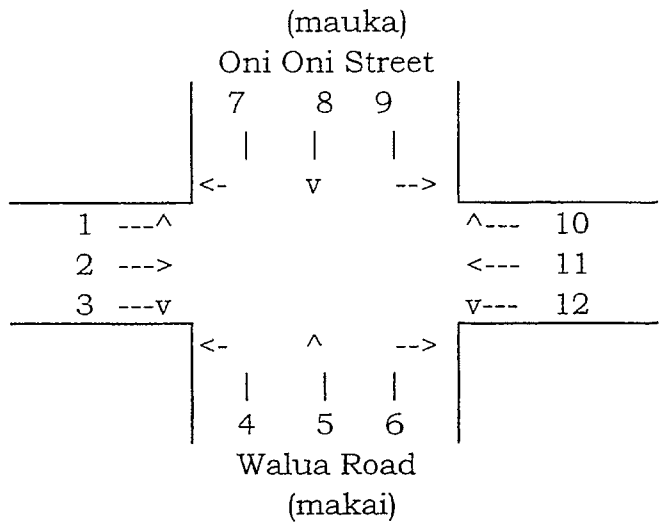


TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45	6	28	16	24	3	0	14	6	3	1	69	2	172
6:45-7:00	23	46	32	23	4	5	22	9	4	1	57	0	226
7:00-7:15	16	51	35	37	4	1	37	5	6	5	60	5	262
7:15-7:30	26	46	20	41	7	8	26	3	8	1	78	3	267
7:30-7:45	35	55	32	49	7	5	45	8	8	2	97	3	346
7:45-8:00	34	75	44	41	16	3	62	12	21	1	115	2	426
8:00-8:15	23	79	48	40	8	5	58	21	8	1	144	5	440
8:15-8:30	16	62	33	44	9	3	52	12	15	2	108	9	365
6:30-8:30	179	442	260	299	58	30	316	76	73	14	728	29	2504
7:30-8:30	108	271	157	174	40	16	217	53	52	6	464	19	1577
PHF	0.89			0.96			0.85			0.82			

TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45	37	151	100	95	39	15	45	16	15	10	113	12	648
3:45-4:00	39	105	53	49	16	10	42	18	18	5	96	14	465
4:00-4:15	45	133	47	47	13	9	50	18	17	6	80	7	472
4:15-4:30	25	92	50	43	15	9	40	13	16	3	66	5	377
4:30-4:45	29	104	55	40	11	7	44	22	17	4	100	8	441
4:45-5:00	22	118	56	39	11	6	48	21	13	6	109	19	468
5:00-5:15	25	131	57	38	15	9	39	25	20	2	115	8	484
5:15-5:30	13	114	62	29	9	7	38	12	16	8	104	8	420
3:30-5:30	235	948	480	380	129	72	346	145	132	44	783	81	3775
3:30-4:30	146	481	250	234	83	43	177	65	66	24	355	38	1962
PHF	0.76			0.6			0.91			0.77			

TRAFFIC TURNING MOVEMENT COUNT

LOCATION: Kuakini Hwy/Walua Rd/Oni Oni St.
DATE: April 6, 2004, Tuesday
TIME: 6:30a-8:30a/3:30p-5:30p
WEATHER: partly cloudy
RECORDER: R. Alberts, T. Lemanski

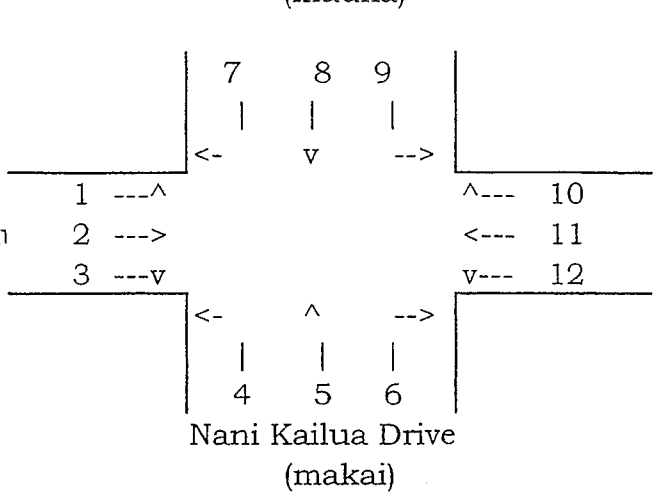


TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45	3	21	9	15	2	9	13	0	2	2	24	9	109
6:45-7:00	1	43	24	22	0	7	8	6	9	1	30	14	165
7:00-7:15	2	35	18	24	1	17	14	2	6	1	32	9	161
7:15-7:30	8	34	12	24	2	9	14	3	2	2	44	11	165
7:30-7:45	6	49	18	29	0	18	14	4	2	3	48	16	207
7:45-8:00	4	34	24	46	6	17	11	2	8	2	46	22	222
8:00-8:15	6	32	16	35	2	11	9	4	6	2	48	16	187
8:15-8:30	4	45	27	29	1	13	8	1	3	4	54	11	200
6:30-8:30	34	293	148	224	14	101	91	22	38	17	326	108	1416
7:30-8:30	20	160	85	139	9	59	42	11	19	11	196	65	816
PHF	0.87			0.75			0.9			0.97			

TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45	11	43	38	24	3	17	6	5	1	5	42	19	214
3:45-4:00	12	51	38	35	5	10	10	3	7	3	53	21	248
4:00-4:15	14	68	29	37	4	16	6	2	1	4	48	14	243
4:15-4:30	15	41	27	21	3	10	7	4	3	3	39	23	196
4:30-4:45	14	62	47	20	0	9	13	2	4	3	56	9	239
4:45-5:00	10	47	39	34	5	6	8	3	0	10	54	19	235
5:00-5:15	6	58	47	25	1	18	11	2	4	4	46	10	232
5:15-5:30	10	46	47	12	3	7	8	0	3	9	37	13	195
3:30-5:30	92	416	312	208	24	93	69	21	23	41	375	128	1802
3:45-4:45	55	222	141	113	12	45	36	11	15	13	196	67	926
PHF	0.85			0.75			0.82			0.9			

TRAFFIC TURNING MOVEMENT COUNT

LOCATION: Queen Kaahumanu Hwy Ext/Nani Kailua Dr
DATE: April 13, 2004, Tuesday
TIME: 6:30a-8:30a/3:30p-5:30p
WEATHER: cloudy
RECORDER: R. Alberts, T. Lemanski

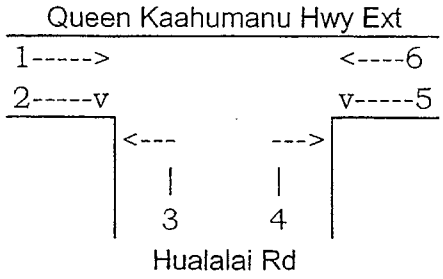


TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
6:30-6:45	2	97	1	6	4	2	18	5	4	1	202	2	344
6:45-7:00	2	132	6	3	7	1	26	8	17	6	234	6	448
7:00-7:15	20	133	3	10	4	2	24	7	20	9	244	3	479
7:15-7:30	13	161	4	7	3	3	31	6	20	8	233	5	494
7:30-7:45	9	188	16	20	4	4	32	13	14	10	226	6	542
7:45-8:00	22	142	15	10	9	4	32	20	16	4	221	2	497
8:00-8:15	18	155	6	20	7	3	31	10	15	14	225	4	508
8:15-8:30	14	148	19	6	2	4	27	18	8	6	209	8	469
6:30-8:30	100	1156	70	82	40	23	221	87	114	58	1794	36	3781
7:15-8:15	62	646	41	57	23	14	126	49	65	36	905	17	2041
PHF	0.88			0.78			0.88			0.99			

TIME	MOVEMENT NUMBER												
PERIOD	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
3:30-3:45	19	196	40	21	8	10	26	2	6	20	235	13	596
3:45-4:00	25	246	13	17	11	7	12	8	8	20	222	15	604
4:00-4:15	19	245	15	29	6	6	8	8	6	15	213	7	577
4:15-4:30	21	211	24	28	8	3	22	7	9	7	177	8	525
4:30-4:45	31	249	11	25	11	8	19	7	2	11	233	10	617
4:45-5:00	28	219	10	20	7	7	15	7	8	7	183	7	518
5:00-5:15	31	230	13	23	10	17	18	3	5	7	192	5	554
5:15-5:30	13	175	14	12	11	4	16	2	5	9	159	2	422
3:30-5:30	187	1771	140	175	72	62	136	44	49	96	1614	67	4413
3:45-4:45	96	951	63	99	36	24	61	30	25	53	845	40	2323
PHF	0.98			0.97			0.76			0.92			

TRAFFIC TURNING MOVEMENT COUNT

LOCATION: Queen Kaahumanu Hwy Ext/Hualalai Rd
DATE: April 14, 2004, Wednesday
TIME: 6:30a-8:30a/3:30p-5:30p
WEATHER: cloudy
RECORDER: L. Harris



TIME	MOVEMENT NUMBER						
PERIOD	1	2	3	4	5	6	TOTAL
6:30-6:45a	127	1	0	10	15	230	383
6:45-7:00a	128	0	0	19	22	222	391
7:00-7:15a	146	1	0	11	21	218	397
7:15-7:30a	192	0	1	11	43	246	493
7:30-7:45a	188	0	0	10	52	244	494
7:45-8:00a	146	3	0	8	76	247	480
8:00-8:15a	159	1	0	16	57	226	459
8:15-8:30a	176	0	0	12	28	217	433
6:30-8:30a	1262	6	1	97	314	1850	3530
7:15-8:15a	685	4	1	45	228	963	1866
PHF	0.90				0.92		
3:30-3:45p	231	3	0	16	28	239	517
3:45-4:00p	197	3	4	15	31	217	467
4:00-4:15p	254	1	1	24	29	186	495
4:15-4:30p	246	1	1	25	25	186	484
4:30-4:45p	251	0	3	23	17	189	483
4:45-5:00p	239	0	1	24	22	194	480
5:00-5:15p	256	1	1	32	8	167	465
5:15-5:30p	222	1	1	17	16	183	440
3:30-5:30p	1896	10	12	176	176	1561	3831
3:30-4:30p	928	8	6	80	113	828	1963
PHF	0.92				0.88		

Appendix B

Traffic Calculations
Signalized and Unsignalized Intersection
Level of Service (LOS) Calculations

Traffic Calculations
Signalized Intersection
Level of Service (LOS) Calculations

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 4/22/04
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: EXISTING AM 2004 | NB/SB Street: KUAKINI HW
Comment: 2004 EXISTING AM

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	175	40	15	50	55	215	20	465	5	110	270	155
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	7	14	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 75 | Lost time per cycle (s): 20 | Critical v/c Ratio: .77

Intersection Performance

	EB			WB		NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)	184	53		111	195	21	489	-5	116	284	132
Capacity (veh/h)	355	613		279	254	481	720	568	320	720	568
Adjusted saturation flow (veh/h)	1770	1767		1497	1361	1770	1863	1469	1770	1863	1469
v/c ratio	.519	.086		.396	.767	.044	.68	-.009	.362	.395	.232
g/C ratio	.347	.347		.187	.187	.52	.387	.387	.52	.387	.387
Average back of queue (veh)	3.3	.1		2.2	4.7	.2	9.6	-.1	1.5	4.6	2
Uniform delay (s)	18.3	16.5		26.8	29	9.2	19.1	14.1	11.5	16.6	15.5
Incremental delay (s)	1.4	0		.2	14.3	0	2.6	0	0	.1	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	19.7	16.5		27	43.3	9.2	21.7	14.1	11.5	16.7	15.5
LOS	B	B		C	D	A	C	B	B	B	B
Approach delay (s)/LOS	19	/	B	37.4	/ D	21.3	/	C	15.3	/	B
Intersection delay (s)/ LOS	22	/	C								

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 AM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	239	57	26	68	78	296	26	556	11	135	340	218
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 20 | Critical v/c Ratio: .675

Intersection Performance

	EB			WB		NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	252	82		154	280	27	585	1	142	358	198
Capacity (veh/h)	366	675		393	389	380	1286	530	345	675	530
Adjusted saturation flow (veh/h)	1770	1743		1497	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.687	122		.391	72	.072	.455	002	412	53	373
g/C ratio	388	388		263	263	488	363	363	488	363	363
Average back of queue (veh)	5	1.2		3	6.6	.3	5.6	0	2.1	6.8	3.5
Uniform delay (s)	21.1	15.7		24.2	26.8	11.7	19.5	16.3	12.3	20.1	18.8
Incremental delay (s)	5.5	0		.1	6.6	0	.2	0	.3	.8	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	26.6	15.7		24.3	33.4	11.7	19.7	16.3	12.6	20.9	18.8
LOS	C	B		C	C	B	B	B	B	C	B
Approach delay (s)/LOS	23.9	/	C	30.2	/ C	19.3	/	B	18.6	/	B
Intersection delay (s)/ LOS	22.1	/	C								

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT1 AM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 TOT AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	239	56	32	71	74	296	35	601	14	133	382	218
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 20 | Critical v/c Ratio: .707

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	252	87		153	280	37	633	4	140	402	198
Capacity (veh/h)	367	667		387	389	345	1286	530	325	675	530
Adjusted saturation flow (veh/h)	1770	1721		1474	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.686	.131		.395	.72	.107	.492	.008	.431	.595	.373
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5	1.3		3	6.6	.5	6.2	.1	2.1	8	3.5
Uniform delay (s)	21.1	15.8		24.3	26.8	12.1	19.8	16.3	12.4	20.7	18.8
Incremental delay (s)	5.4	0		.2	6.6	0	.3	0	.5	1.4	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	26.5	15.8		24.5	33.4	12.1	20.1	16.3	12.9	22.1	18.8
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	23.7	/	C	30.3	/	C	19.6	/	B	19.5	/	B
Intersection delay (s)/ LOS	22.3			/			C					

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

2.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	60	28	72	83	314	28	623	12	143	381	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 15 | Critical v/c Ratio: .671

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	266	87		163	236	29	656	2	151	401	212
Capacity (veh/h)	358	674		391	389	346	1286	530	315	675	530
Adjusted saturation flow (veh/h)	1770	1740		1489	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.745	.13		.417	.606	.085	.51	.004	.477	.594	.399
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5.6	1.3		3.3	5.2	.4	6.5	0	2.4	8	3.8
Uniform delay (s)	21.9	15.8		24.4	25.9	12.1	19.9	16.3	12.6	20.7	19
Incremental delay (s)	8.7	0		.3	2.7	0	.3	0	1	1.4	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	30.6	15.8		24.7	28.6	12.1	20.2	16.3	13.6	22.1	19.1
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	26.9	/	C	27	/	C	19.9	/	B	19.6	/	B
Intersection delay (s)/ LOS	22.2			/			C					

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT1 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	59	34	75	79	304	36	688	15	141	422	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 15 | Critical v/c Ratio: .699

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	266	93		162	225	38	724	5	148	444	212
Capacity (veh/h)	359	666		385	389	313	1286	530	288	675	530
Adjusted saturation flow (veh/h)	1770	1720		1467	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.743	.139		.421	.579	.121	.563	.01	.515	.658	.399
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5.6	1.4		3.2	4.9	.5	7.4	.1	2.4	9.2	3.8
Uniform delay (s)	21.8	15.9		24.5	25.7	12.6	20.4	16.3	12.9	21.3	19
Incremental delay (s)	8.5	0		.3	2.2	0	.6	0	1.6	2.4	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	30.3	15.9		24.8	27.9	12.6	21	16.3	14.5	23.7	19.1
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	26.6 / C			26.6 / C		20.6 / C			20.8 / C		
Intersection delay (s)/ LOS	22.6 /								C		

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB2 AM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 AMB AM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	239	57	26	68	78	296	26	624	11	135	394	218
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 20 | Critical v/c Ratio: .716

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	252	82		154	280	27	657	1	142	415	198
Capacity (veh/h)	366	675		393	389	336	1286	530	315	675	530
Adjusted saturation flow (veh/h)	1770	1743		1497	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.687	.122		.391	.72	082	.511	002	.451	.614	.373
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5	1.2		3	6.6	3	6 5	0	2.2	8.4	3.5
Uniform delay (s)	21.1	15.7		24.2	26.8	12.2	20	16.3	12.6	20.9	18.8
Incremental delay (s)	5.5	0		.1	6 6	0	.3	0	.7	1.7	0
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	26.6	15.7		24.3	33.4	12.2	20.3	16.3	13.3	22.6	18 8
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	23.9 / C			30.2 / C		19.9 / B			19.9 / B		
Intersection delay (s)/ LOS	22.5 /								C		

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT2 AM 2010
Comment: 2010 TOT AM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	239	56	32	71	74	286	35	669	14	133	436	218
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 Lost time per cycle (s): 20 Critical v/c Ratio: .738

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	1	1
Flow rate (veh/h)	252	87		153	269		37	704	4	140	459	198
Capacity (veh/h)	367	667		387	389		302	1286	530	296	675	530
Adjusted saturation flow (veh/h)	1770	1721		1474	1481		1770	3547	1463	1770	1863	1463
v/c ratio	.686	.131		.395	.693		.122	.548	.008	.473	.68	.373
g/C ratio	.388	.388		.263	.263		.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5	1.3		3	6.2		.5	7.2	.1	2.2	9.7	3.5
Uniform delay (s)	21.1	15.8		24.3	26.6		12.7	20.3	16.3	12.8	21.6	18.8
Incremental delay (s)	5.4	0		.2	5.4		0	.5	0	1	2.8	0
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	26.5	15.8		24.5	32		12.7	20.8	16.3	13.8	24.4	18.8
LOS	C	B		C	C		B	C	B	B	C	B
Approach delay (s)/LOS	23.7	/	C	29.3	/	C	20.4	/	C	21.1	/	C
Intersection delay (s)/ LOS	22.8		/			C						

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 AM 2016
Comment: 2016 AMB AM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	60	28	72	83	314	28	731	12	143	468	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 Lost time per cycle (s): 15 Critical v/c Ratio: .731

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R		L	T	R	L	T	R
No. of lanes	1	1		1	1		1	2	1	1	1	1
Flow rate (veh/h)	266	87		163	236		29	769	2	151	493	212
Capacity (veh/h)	358	674		391	389		276	1286	530	272	675	530
Adjusted saturation flow (veh/h)	1770	1740		1489	1481		1770	3547	1463	1770	1863	1463
v/c ratio	.745	.13		.417	.606		.107	.599	.004	.554	.73	.399
g/C ratio	.388	.388		.263	.263		.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5.6	1.3		3.3	5.2		.4	8.1	0	2.6	10.8	3.8
Uniform delay (s)	21.9	15.8		24.4	25.9		13.1	20.8	16.3	13.2	22.1	19
Incremental delay (s)	8.7	0		3	2.7		0	.8	0	2.5	4.1	.1
Initial queue delay (s)	0	0		0	0		0	0	0	0	0	0
Delay (s)	30.6	15.8		24.7	28.6		13.1	21.6	16.3	15.7	26.2	19.1
LOS	C	B		C	C		B	C	B	B	C	B
Approach delay (s)/LOS	26.9	/	C	27	/	C	21.2	/	C	22.6	/	C
Intersection delay (s)/ LOS	23.5		/			C						

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT2 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT AM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	59	34	75	79	304	36	796	9	143	509	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 15 | Critical v/c Ratio: .759

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	266	93		162	225	38	838	-1	148	536	212
Capacity (veh/h)	359	666		385	389	244	1286	530	248	675	530
Adjusted saturation flow (veh/h)	1770	1720		1467	1481	1770	3547	1463	1770	1863	1463
v/c ratio	.743	.139		.421	.579	.155	.652	-.002	.599	.793	.399
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5.6	1.4		3.2	4.9	.5	9.1	0	2.6	12.6	3.8
Uniform delay (s)	21.8	15.9		24.5	25.7	13.8	21.3	16.2	13.7	22.8	19
Incremental delay (d)	8.5	0		.3	2.2	0	1.2	0	4.1	6.8	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	30.3	15.9		24.8	27.9	13.8	22.5	16.2	17.8	29.6	19.1
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	26.6 / C			26.6 / C		22.1 / C			25.2 / C		
Intersection delay (s)/ LOS	24.5 / C											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB3 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB AM SCEN3 W/ PKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	60	28	72	83	314	28	833	12	143	366	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 15 | Critical v/c Ratio: .71

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	266	87		163	236	29	877	2	151	385	212
Capacity (veh/h)	358	674		391	389	358	1286	530	235	675	530
Adjusted saturation flow (veh/h)	1770	1740		1489	1481	1770	3547	1463	1770	1863	1463
v/c ratio	745	.13		.417	606	.082	.682	.004	641	.571	399
g/C ratio	.388	388		263	.263	488	.363	363	488	363	363
Average back of queue (veh)	5.6	1.3		3.3	5.2	.4	9.7	0	2.8	7.6	3.8
Uniform delay (s)	21.9	15.8		24.4	25.9	11.9	21.6	16.3	14	20.5	19
Incremental delay (s)	8.7	0		.3	2.7	0	1.5	0	6	1.2	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	30.6	15.8		24.7	28.6	11.9	23.1	16.3	20	21.7	19.1
LOS	C	B		C	C	B	C	B	B	C	B
Approach delay (s)/LOS	26.9 / C			27 / C		22.7 / C			20.6 / C		
Intersection delay (s)/ LOS	23.4 / C											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT3 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT AM SCEN3 W/ FKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	253	59	34	75	79	304	36	898	15	141	422	231
RTOR volume (veh/h)			5			90			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	5	21	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 80 | Lost time per cycle (s): 15 | Critical v/c Ratio: .733

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	266	93		162	225	38	945	5	148	444	212
Capacity (veh/h)	359	666		385	389	313	1286	530	213	675	530
Adjusted saturation flow (veh/h)	1770	1720		1467	1481	1770	3547	1462	1770	1863	1463
v/c ratio	.743	.139		.421	.579	.121	.735	.01	.695	.658	.399
g/C ratio	.388	.388		.263	.263	.488	.363	.363	.488	.363	.363
Average back of queue (veh)	5.6	1.4		3.2	4.9	.5	11	.1	2.9	9.2	3.8
Uniform delay (s)	21.8	15.9		24.5	25.7	12.6	22.2	16.3	14.7	21.3	19
Incremental delay (s)	8.5	0		.3	2.2	0	2.3	0	9.9	2.4	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	30.3	15.9		24.8	27.9	12.6	24.5	16.3	24.6	23.7	19.1
LOS	C	B		C	C	B	C	B	C	C	B
Approach delay (s)/LOS	26.6	/	C	26.6	/	C	24	/	C	22.7	/	C
Intersection delay (s)/ LOS	24.3		/		C							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 4/22/04
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: EXISTING PM 2004 | NB/SB Street: KUAKINI HW
Comment: 2004 EXISTING PM

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	235	85	45	65	65	175	40	355	25	145	480	250
RTOR volume (veh/h)			5			30			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB		LTRP						
NB			L	LTRP				
SB			L	LTRP				
Green (s)	6	16	5	29				
Yellow + All red (s)	5	5	5	5				

Cycle (s): 76 | Lost time per cycle (s): 15 | Critical v/c Ratio: .706

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)	247	132		137	153	42	374	16	153	505	232
Capacity (veh/h)	337	611		297	291	299	711	560	400	711	560
Adjusted saturation flow (veh/h)	1770	1720		1411	1384	1770	1863	1468	1770	1863	1468
v/c ratio	.733	.215		.461	524	.141	526	.028	.381	.711	.413
g/C ratio	.355	.355		.211	.211	513	382	.382	.513	.382	.382
Average back of queue (veh)	5.1	2.1		2.8	3.2	.5	6.7	2	2.1	10.3	3.9
Uniform delay (s)	20.8	17.1		26.2	26.6	11.5	18.2	14.7	11	19.9	17.3
Incremental delay (s)	8.4	0		.8	1.7	0	.7	0	.1	3.4	.2
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	29.2	17.1		27	28.3	11.5	18.9	14.7	11.1	23.3	17.5
LOS	C	B		C	C	B	B	B	B	C	B
Approach delay (s)/LOS	25	/	C	27.7	/	C	18	/	B	19.7	/	B
Intersection delay (s)/ LOS	21.5		/		C							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 PM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 AMB SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	286	104	52	78	88	229	47	470	68	198	616	338
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	15	24	8	5	37			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 114 | Lost time per cycle (s): 25 | Critical v/c Ratio: .81

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	301	159		175	188	49	495	61	208	648	324
Capacity (veh/h)	388	666		295	563	409	1151	471	501	768	608
Adjusted saturation flow (veh/h)	1770	1726		1404	1459	1770	3547	1450	1770	1863	1476
v/c ratio	.776	.239		.591	.335	.121	.43	.13	.416	.844	.533
g/C ratio	.386	.386		.211	.386	.439	.325	.325	.526	.412	.412
Average back of queue (veh)	9.5	3.6		5.5	4.5	1	6.9	1.4	4.3	22	8.4
Uniform delay (s)	27.1	23.7		40.6	24.7	18.5	30.2	27.1	15.5	30.2	25.2
Incremental delay (s)	10.2	0		3.2	0	0	.1	0	.2	9.3	.9
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	37.3	23.7		43.8	24.7	18.5	30.3	27.1	15.7	39.5	26.1
LOS	D	C		D	C	B	C	C	B	D	C
Approach delay (s)/LOS	32.6	/	C	33.9	/	C	29	/	C	31.6	/	C
Intersection delay (s)/ LOS	31.5			/			C					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT1 PM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 TOT SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	286	102	59	82	85	224	55	510	63	188	676	338
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	15	24	5	8	40			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 117 | Lost time per cycle (s): 25 | Critical v/c Ratio: .852

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	301	164		176	183	58	537	56	198	712	324
Capacity (veh/h)	373	644		284	548	356	1213	498	492	844	672
Adjusted saturation flow (veh/h)	1770	1712		1382	1456	1770	3547	1456	1770	1863	1484
v/c ratio	.807	.255		.62	.334	.163	.443	.112	.402	.843	.482
g/C ratio	.376	.376		205	.376	.427	.342	.342	.538	.453	.453
Average back of queue (veh)	10.1	3.9		5.8	4.5	1.2	7.6	1.3	4	24.2	8
Uniform delay (s)	28.7	25.2		42.3	26.1	19.8	29.9	26.3	15.2	28.3	22.4
Incremental delay (s)	13.5	0		4.2	0	0	.2	0	.2	8.4	.5
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	42.2	25.2		46.5	26.1	19.8	30.1	26.3	15.4	36.7	22.9
LOS	D	C		D	C	B	C	C	B	D	C
Approach delay (s)/LOS	36.2	/	D	36.1	/	D	28.8	/	C	29.7	/	C
Intersection delay (s)/ LOS	31.4			/			C					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB1 PM 2016
Comment: 2016 AMB SCEN1 W/NO IMPROVEMENTS

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	110	55	83	93	243	50	526	72	210	690	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	19	24	5	12	44			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 129 Lost time per cycle (s): 25 Critical v/c Ratio: .868

Intersection Performance

	EB			WB		NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	168		185	203	53	554	65	221	726	345
Capacity (veh/h)	372	642		259	537	342	1210	497	510	881	704
Adjusted saturation flow (veh/h)	1770	1725		1393	1444	1770	3547	1456	1770	1863	1488
v/c ratio	.857	.262		.715	.378	.154	.458	.131	.433	.825	.491
g/C ratio	.372	.372		.186	.372	.419	.341	.341	.55	.473	.473
Average back of queue (veh)	12.6	4.4		7.2	5.7	1.2	8.7	1.7	5	26.1	9.2
Uniform delay (s)	32.5	28.2		49.3	29.6	22.5	33.2	29.3	16.3	29.4	23.3
Incremental delay (s)	20.7	0		9.5	.1	0	.2	0	.3	6.8	.5
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	53.2	28.2		58.8	29.7	22.5	33.4	29.3	16.6	36.2	23.8
LOS	D	C		E	C	C	C	C	B	D	C
Approach delay (s)/LOS	44.6 / D			43.6 / D		32.1 / C			29.5 / C		
Intersection delay (s)/ LOS	34.6 / C										

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT1 PM 2016
Comment: 2016 TOT SCEN1 W/NO IMPROVEMENTS

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	108	63	92	90	238	58	575	67	200	770	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	21	24	5	12	48			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 135 Lost time per cycle (s): 25 Critical v/c Ratio: .94

Intersection Performance

	EB			WB		NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	175		192	198	61	605	60	211	811	345
Capacity (veh/h)	371	633		242	533	327	1261	519	488	897	717
Adjusted saturation flow (veh/h)	1770	1710		1362	1438	1770	3547	1461	1770	1863	1489
v/c ratio	.86	.276		.791	.371	.187	.48	116	.432	.904	.481
g/C ratio	.37	.37		.178	.37	.43	.356	.356	556	.481	.481
Average back of queue (veh)	13.3	4.8		8.2	5.8	1.5	9.9	1.6	4.9	34.6	9.4
Uniform delay (s)	34.3	29.8		53.1	31	22.7	33.8	29.2	16.9	32.1	23.6
Incremental delay (s)	21.5	0		18.1	0	0	.2	0	.3	14.8	.4
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	55.8	29.8		71.2	31	22.7	34	29.2	17.2	46.9	24
LOS	E	C		E	C	C	C	C	B	D	C
Approach delay (s)/LOS	46.6 / D			50.8 / D		32.7 / C			36.6 / D		
Intersection delay (s)/ LOS	39.1 / D										

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 PM 2010
Comment: 2010 AMB SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	286	104	52	78	88	229	47	523	68	198	674	338
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	15	24	5	10	37			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 116 Lost time per cycle (s): 25 Critical v/c Ratio: .845

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R	
No. of lanes	1	1		1	1	1	2	1	1	1	1	
Flow rate (veh/h)	301	159		175	188	49	551	61	208	709	324	
Capacity (veh/h)	378	655		290	553	341	1131	462	497	835	665	
Adjusted saturation flow (veh/h)	1770	1726		1403	1457	1770	3547	1448	1770	1863	1483	
v/c ratio	.795	.243		.602	.341	.145	.487	.132	.42	.85	.488	
g/C ratio	.379	.379		.207	.379	.405	.319	.319	.534	.448	.448	
Average back of queue (veh)	9.9	3.7		5.7	4.6	1	8.1	1.5	4.3	24.2	8	
Uniform delay (s)	28.1	24.6		41.7	25.7	21.1	31.8	28.1	15.6	28.5	22.6	
Incremental delay (s)	12.2	0		3.5	0	0	.3	0	.2	9	.5	
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	
Delay (s)	40.3	24.6		45.2	25.7	21.1	32.1	28.1	15.8	37.5	23.1	
LOS	D	C		D	C	C	C	C	B	D	C	
Approach delay (s)/LOS	34.9	/	C	35.1	/	D	30.9	/	C	30.1	/	C
Intersection delay (s)/ LOS	31.8	/	C									

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT2 PM 2010
Comment: 2010 TOT SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	286	102	59	82	85	224	55	563	63	188	734	338
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	15	24	5	10	41			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 120 Lost time per cycle (s): 20 Critical v/c Ratio: .834

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R	
No. of lanes	1	1		1	1	1	2	1	1	1	1	
Flow rate (veh/h)	301	164		176	183	58	593	56	198	773	324	
Capacity (veh/h)	360	627		276	533	338	1212	497	490	869	694	
Adjusted saturation flow (veh/h)	1770	1711		1381	1453	1770	3547	1456	1770	1863	1487	
v/c ratio	.836	.262		.636	.344	171	.489	.112	.404	889	.467	
g/C ratio	367	.367		.2	.367	425	.342	.342	55	.467	.467	
Average back of queue (veh)	10.8	4.1		6	4.7	1.2	8.8	1.3	4.1	28.9	7.9	
Uniform delay (s)	30.7	26.6		44	27.5	20.5	31.2	27	15.2	29.2	21.8	
Incremental delay (s)	17.9	0		4.9	0	0	.3	0	.2	12.9	.4	
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0	
Delay (s)	48.6	26.6		48.9	27.5	20.5	31.5	27	15.4	42.1	22.2	
LOS	D	C		D	C	C	C	C	B	D	C	
Approach delay (s)/LOS	40.9	/	D	38	/	D	30.3	/	C	33	/	C
Intersection delay (s)/ LOS	34.3	/	C									

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB2 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB PM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	110	55	83	93	243	50	637	72	210	812	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	19	24	5	12	45			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 130 | Lost time per cycle (s): 25 | Critical v/c Ratio: .951

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	168		185	203	53	671	65	221	855	345
Capacity (veh/h)	368	637		257	533	314	1228	505	466	888	710
Adjusted saturation flow (veh/h)	1770	1724		1393	1443	1770	3547	1458	1770	1863	1489
v/c ratio	.866	.265		.72	.381	.168	.546	.129	.475	.962	.486
g/C ratio	.369	.369		.185	.369	.423	.346	.346	.554	.477	.477
Average back of queue (veh)	12.9	4.5		7.2	5.7	1.2	11	1.7	5.2	41.7	9.2
Uniform delay (s)	33.1	28.7		49.8	30.1	22.3	34.3	29.1	17.1	32.9	23.2
Incremental delay (s)	22.8	0		10	.1	0	.5	0	.6	32.7	.5
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	55.9	28.7		59.8	30.2	22.3	34.8	29.1	17.7	65.6	23.7
LOS	E	C		E	C	C	C	C	B	E	C
Approach delay (s)/LOS	46.5 / D			44.3 / D		33.5 / C			47.9 / D		
Intersection delay (s)/ LOS	43.6 / D										

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

10

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT2 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT PM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	108	63	92	90	238	58	686	67	200	892	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	28	30	5	12	75			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 175 | Lost time per cycle (s): 25 | Critical v/c Ratio: .972

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	175		192	198	61	722	60	211	939	345
Capacity (veh/h)	369	615		333	516	321	1520	634	436	979	787
Adjusted saturation flow (veh/h)	1770	1709		1361	1434	1770	3547	1479	1770	1863	1496
v/c ratio	.863	.284		.321	.383	.19	.475	.095	.483	.959	.439
g/C ratio	.36	.36		.171	.36	.486	.429	.429	.583	.526	.526
Average back of queue (veh)	17.1	6.4		10.8	7.6	1.7	14	1.8	6.3	57.6	11
Uniform delay (s)	45.6	39.9		69.9	41.6	24	35.9	29.8	20.2	39.7	25.6
Incremental delay (s)	22.2	0		23.7	.1	0	.2	0	.7	28.8	.2
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	67.8	39.9		93.6	41.7	24	36.1	29.8	20.9	68.5	25.8
LOS	E	D		F	D	C	D	C	C	E	C
Approach delay (s)/LOS	58 / E			67.2 / E		34.8 / C			51.9 / D		
Intersection delay (s)/ LOS	50.2 / D										

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB3 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB PM SCEN23W/ PKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	110	55	83	93	243	50	711	72	210	950	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	27	36	5	12	85			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 190 | Lost time per cycle (s): 25 | Critical v/c Ratio: .965

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	168		185	203	53	748	65	221	1000	345
Capacity (veh/h)	367	617		264	518	288	1587	664	423	1000	804
Adjusted saturation flow (veh/h)	1770	1723		1392	1447	1770	3547	1483	1770	1863	1498
v/c ratio	.87	.273		.703	.392	.183	.472	.098	.522	1	.429
g/C ratio	.358	.358		.189	.358	.5	.447	.447	.589	.537	.537
Average back of queue (veh)	18.5	6.6		10.3	8.5	1.6	15.4	2.1	7.4	76	11.7
Uniform delay (s)	49.6	43.4		72	45.6	24.7	36.8	30.3	21.6	44	26.5
Incremental delay (s)	23.8	0		8.5	.1	0	.2	0	1.2	56.9	.2
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	73.4	43.4		80.5	45.7	24.7	37	30.3	22.8	100.9	26.7
LOS	E	D		F	D	C	D	C	C	F	C
Approach delay (s)/LOS	63 / E			62.3 / E		35.7 / D			73.5 / E		
Intersection delay (s)/ LOS	60.8 /								E		

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

111

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: TOT3 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT PM SCEN23W/ PKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	303	108	63	92	90	238	58	760	67	300	1030	358
RTOR volume (veh/h)			5			50			10			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTR	LTRP						
WB	R	LTRP						
NB			L		LTRP			
SB			L	LTRP	LTRP			
Green (s)	27	36	5	12	105			
Yellow + All red (s)	5	5	5	5	5			

Cycle (s): 210 | Lost time per cycle (s): 20 | Critical v/c Ratio: 1.039

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L	TR		LT	R	L	T	R	L	T	R
No. of lanes	1	1		1	1	1	2	1	1	1	1
Flow rate (veh/h)	319	175		192	198	61	800	60	211	1084	345
Capacity (veh/h)	314	552		233	464	285	1773	746	427	1082	873
Adjusted saturation flow (veh/h)	1770	1704		1357	1434	1770	3547	1492	1770	1863	1503
v/c ratio	1.014	.317		.824	.426	.214	.451	.08	493	1.002	.395
g/C ratio	.324	.324		.171	.324	.548	.5	.5	.629	.581	.581
Average back of queue (veh)	28.5	8.1		12.8	9.6	1.9	16.7	1.9	7	89.3	11.6
Uniform delay (s)	63.4	53.5		83.9	55.7	22.6	33.9	27.3	20	44	23.9
Incremental delay (s)	115.8	0		24.3	.3	0	.1	0	.9	56.5	.1
Initial queue delay (s)	0	0		0	0	0	0	0	0	0	0
Delay (s)	179.2	53.5		108.2	56	22.6	34	27.3	20.9	100.5	24
LOS	F	D		F	E	C	C	C	C	F	C
Approach delay (s)/LOS	134.7 / F			81.7 / F		32.8 / C			74.2 / E		
Intersection delay (s)/ LOS	72.6 /								E		

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: EXISTING AM 2004
Comment: 2004 EXISTING AM

Site Information

Jurisdiction/Date: 2/21/05
EB/WB Street: NANI KAILU
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	55	25	15	125	50	65	15	905	35	60	645	40
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	21	3	64					
Yellow + All red (s)	5.4	3.8	4.8					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .83

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		87	5		190	27	16	984	27	65	701	22
Capacity (veh/h)		170	318		247	318	376	1169	986	181	1169	986
Adjusted saturation flow (veh/h)		826	1545		1199	1545	1770	1863	1571	1770	1863	1571
v/c ratio		.512	.017		.77	.085	.043	.842	.028	.361	.6	.022
g/C ratio		.206	.206		.206	.206	.704	.627	.627	.704	.627	.627
Average back of queue (veh)		2.5	.1		6.1	.7	.1	26.2	.3	.8	13.1	.2
Uniform delay (s)		35.9	32.3		38.2	32.7	7.5	15	7.2	16.2	11.4	7.2
Incremental delay (s)		2.6	0		15.1	0	0	6	0	0	.9	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		38.5	32.3		53.3	32.7	7.5	21	7.2	16.2	12.3	7.2
LOS		D	C		D	C	A	C	A	B	B	A
Approach delay (s)/LOS	38.2	/	D	50.8	/	D	20.4	/	C	12.4	/	B
Intersection delay (s)/ LOS	21.3			/			C					

HICAP 2000™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB1 AM 2010
Comment: 2010 AMB AM&TOT SCEN1 W/NO IMPS

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: NANI KAILU
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	62	26	16	68	52	135	21	1048	36	68	724	47
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	24	4	83					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 126 Lost time per cycle (s): 15 Critical v/c Ratio: .831

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		93	6		126	100	22	1103	27	72	762	28
Capacity (veh/h)		182	294		223	294	375	1227	1035	140	1227	1035
Adjusted saturation flow (veh/h)		955	1542		1169	1542	1770	1863	1571	1770	1863	1571
v/c ratio		.509	.022		.567	.141	.059	.899	.026	.512	.621	.027
g/C ratio		.19	.19		.19	.19	.737	.659	.659	.737	.659	.659
Average back of queue (veh)		3.2	.2		4.5	3.2	.2	39.9	.4	1.2	17	.4
Uniform delay (s)		45.7	41.5		46.3	44.1	8.5	18	7.5	26	12.4	7.5
Incremental delay (s)		2.4	0		3.4	0	0	10.4	0	3.2	1	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		48.1	41.5		49.7	44.1	8.5	28.4	7.5	29.2	13.4	7.5
LOS		D	D		D	D	A	C	A	C	B	A
Approach delay (s)/LOS	47.7	/	D	47.2	/	D	27.5	/	C	14.5	/	B
Intersection delay (s)/ LOS	25.5			/			C					

HICAP 2000™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB1 AM 2016
Comment: 2016 AMB&TOT AM SCEN1 W/NO IMPS

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: NANI KAILU
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	66	28	17	72	55	143	22	1174	38	72	811	50
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	35	5	180					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 235 Lost time per cycle (s): 15 Critical v/c Ratio: .884

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		99	7		134	108	23	1236	29	76	854	32
Capacity (veh/h)		103	228		139	228	411	1427	1205	162	1427	1205
Adjusted saturation flow (veh/h)		695	1530		935	1530	1770	1863	1573	1770	1863	1573
v/c ratio		956	.032		.96	.476	.056	.866	.024	.467	.598	.026
g/C ratio		.149	.149		.149	.149	.812	.766	.766	.812	.766	.766
Average back of queue (veh)		9.4	.4		12.5	6.9	.3	65.1	.5	1.6	26.3	.5
Uniform delay (s)		99.2	85.5		99.3	91.6	9.6	19.1	6.6	41.5	11.9	6.6
Incremental delay (s)		132.4	0		113.4	1.3	0	6.3	0	1.6	.7	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		231.6	85.5		212.7	92.9	9.6	25.4	6.6	43.1	12.6	6.6
LOS		F	F		F	F	A	C	A	D	B	A
Approach delay (s)/LOS	221.5 / F			159.1 / F			24.7 / C			14.8 / B		
Intersection delay (s)/ LOS	41.6 / D											

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

13.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 AM 2010
Comment: 2010 AMB AM&TOT SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: NANI KAILU
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: 1 h Signal type: Actuated-Field % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	62	26	16	68	52	135	21	976	36	68	648	47
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	24	4	83					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 126 Lost time per cycle (s): 15 Critical v/c Ratio: .785

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		93	6		126	100	22	1027	27	72	682	28
Capacity (veh/h)		182	294		223	294	431	1227	1035	193	1227	1035
Adjusted saturation flow (veh/h)		955	1542		1169	1542	1770	1863	1571	1770	1863	1571
v/c ratio		.509	.022		.567	.341	.051	.837	.026	37	.556	.027
g/C ratio		.19	19		19	.19	.737	.659	659	.737	.659	.659
Average back of queue (veh)		3.2	.2		4.5	3.2	.2	32.1	.4	1	14	.4
Uniform delay (s)		45.7	41.5		46.3	44.1	7.2	16.4	7.5	19.5	11.6	7.5
Incremental delay (s)		2.4	0		3.4	0	0	5.5	0	.1	.6	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		48.1	41.5		49.7	44.1	7.2	21.9	7.5	19.6	12.2	7.5
LOS		D	D		D	D	A	C	A	B	B	A
Approach delay (s)/LOS	47.7 / D			47.2 / D			21.2 / C			12.7 / B		
Intersection delay (s)/ LOS	22 / C											

HICAP 2000 TM
©Catalina Engineering, Inc

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB2 AM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB&TOT AM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	66	28	17	72	55	143	22	1142	38	72	777	50
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	35	5	180					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 235 | Lost time per cycle (s): 15 | Critical v/c Ratio: .863

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		99	7		134	108	23	1202	29	76	813	32
Capacity (veh/h)		103	228		139	228	434	1427	1205	186	1427	1205
Adjusted saturation flow (veh/h)		695	1530		935	1530	1770	1863	1573	1770	1863	1573
v/c ratio		.956	.032		.96	.476	.053	.843	.024	.408	.573	.026
g/C ratio		.149	.149		.149	.149	.812	.766	.766	.812	.766	.766
Average back of queue (veh)		9.4	.4		12.5	6.9	.3	59.4	.5	1.5	24.3	.5
Uniform delay (s)		99.2	85.5		99.3	91.6	8.8	18.1	6.6	35.4	11.5	6.6
Incremental delay (s)		132.4	0		113.4	1.3	0	5	0	.5	.6	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		231.6	85.5		212.7	92.9	8.8	23.1	6.6	35.9	12.1	6.6
LOS		F	F		F	F	A	C	A	D	B	A
Approach delay (s)/LOS	221.5 / F			159.1 / F			22.5 / C			13.8 / B		
Intersection delay (s)/ LOS	40.8 / D											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB3AM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB&TOT AM SCEN3 W/ PKWY &4LH

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	66	28	17	72	55	143	22	1404	38	72	1011	50
RTOR volume (veh/h)			10			40			10			20
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	35	5	90					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 145 | Lost time per cycle (s): 15 | Critical v/c Ratio: .623

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	2	1	1	2	1
Flow rate (veh/h)		99	7		134	108	23	1478	29	76	1064	32
Capacity (veh/h)		263	377		303	377	307	2201	975	185	2201	975
Adjusted saturation flow (veh/h)		1088	1564		1256	1564	1770	3547	1571	1770	3547	1571
v/c ratio		.377	02		.441	.287	.075	671	.03	.41	.483	.032
g/C ratio		.241	241		.241	.241	.695	.621	.621	695	.621	.621
Average back of queue (veh)		3.6	.2		4.9	3.8	.3	22.4	.5	1.4	13.1	.5
Uniform delay (s)		45.9	41.9		46.7	44.8	9	17.9	10.6	14.8	14.9	10.6
Incremental delay (s)		.1	0		.6	0	0	.8	0	.5	.1	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		46	41.9		47.3	44.8	9	18.7	10.6	15.3	15	10.6
LOS		D	D		D	D	A	B	B	B	B	B
Approach delay (s)/LOS	45.7 / D			46.2 / D			18.4 / B			14.9 / B		
Intersection delay (s)/ LOS	20.2 / C											

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 2/21/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: EXISTING PM 2004 | NB/SB Street: QUEEN KAAH
Comment: 2004 EXISTING PM

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	100	35	25	25	30	60	40	845	55	95	950	95
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	19	5	55					
Yellow + All red (s)	5.4	3.8	5.8					

Cycle (s): 94 | Lost time per cycle (s): 15 | Critical v/c Ratio: .826

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		142	16		58	32	42	889	42	100	1000	68
Capacity (veh/h)		276	312		297	312	173	1090	919	244	1090	919
Adjusted saturation flow (veh/h)		1364	1544		1469	1544	1770	1863	1570	1770	1863	1570
v/c ratio		.516	.051		.195	.101	.243	.816	.046	.409	.918	.074
g/C ratio		.202	.202		.202	.202	.7	.585	.585	.7	.585	.585
Average back of queue (veh)		3.7	.4		1.3	.7	.5	21.6	.5	1.2	30.5	.8
Uniform delay (s)		33.4	30.2		31.1	30.5	17.9	15.5	8.3	13.7	17.5	8.5
Incremental delay (s)		1.7	0		0	0	0	5.1	0	.4	14.6	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		35.1	30.2		31.1	30.5	17.9	20.6	8.3	14.1	32.1	8.5
LOS		D	C		C	C	B	C	A	B	C	A
Approach delay (s)/LOS	34.6	/	C	30.9	/	C	19.9	/	B	29.1	/	C
Intersection delay (s)/ LOS	25.8			/			C					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMBI PM 2010 | NB/SB Street: QUEEN KAAH
Comment: 2010 AMB&TOT PM SCEN1 W/NO IMPS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	130	36	26	26	31	62	42	967	57	104	1102	114
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	P	LTRP				
SB		L	LTRP	LTRP				
Green (s)	32	3	6	83				
Yellow + All red (s)	5.4	3.8	3.8	5.8				

Cycle (s): 142.8 | Lost time per cycle (s): 18.8 | Critical v/c Ratio: .901

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		175	17		60	34	44	1018	44	109	1160	88
Capacity (veh/h)		283	347		306	347	337	1083	912	117	1211	1021
Adjusted saturation flow (veh/h)		1263	1548		1366	1548	1770	1863	1570	1770	1863	1571
v/c ratio		.617	.049		.196	.097	.131	.94	.048	.932	.958	.087
g/C ratio		.224	.224		.224	.224	.643	.581	.581	.711	.65	.65
Average back of queue (veh)		6.9	.5		2	1.1	.7	48.4	.8	5	57.5	1.4
Uniform delay (s)		49.9	43.5		45	43.9	9.3	27.6	12.9	32.8	23.2	9.3
Incremental delay (s)		4.1	0		0	0	0	20	0	102.6	24.2	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		54	43.5		45	43.9	9.3	47.6	12.9	135.4	47.4	9.3
LOS		D	D		D	D	A	D	B	F	D	A
Approach delay (s)/LOS	53.1	/	D	44.6	/	D	44.7	/	D	52	/	D
Intersection delay (s)/ LOS	48.9			/			D					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB1 PM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB&TOT PM SCEN1 W/NO IMPS

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	138	38	28	28	33	66	45	1083	60	110	1234	121
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	P	LTRP				
SB		L	LTRP	LTRP				
Green (s)	32	3	6	170				
Yellow + All red (s)	5.4	3.8	3.8	5.8				

Cycle (s): 229.8 | Lost time per cycle (s): 18.8 | Critical v/c Ratio: .968

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		185	19		64	38	47	1140	47	116	1299	96
Capacity (veh/h)		145	213		88	213	346	1378	1163	199	1457	1231
Adjusted saturation flow (veh/h)		1039	1526		630	1526	1770	1863	1573	1770	1863	1573
v/c ratio		1.28	.089		.732	.178	.137	.827	.041	.581	.891	.078
g/C ratio		.139	.139		.139	.139	.778	.74	.74	.821	.782	.782
Average back of queue (veh)		33.7	1.1		4.7	2.2	.8	55.5	.9	2.7	70.5	1.5
Uniform delay (s)		98.9	86.2		94.8	87.3	5.8	20.1	8	34.3	18	5.8
Incremental delay (s)		555.9	0		30.6	0	0	4.5	0	4.3	8.1	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		654.8	86.2		125.4	87.3	5.8	24.6	8	38.6	26.1	5.8
LOS		F	F		F	F	A	C	A	D	C	A
Approach delay (s)/LOS	602 / F			111.3 / F			23.2 / C			25.7 / C		
Intersection delay (s)/ LOS	66.1 / E											

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB2 PM 2010 | NB/SB Street: QUEEN KAAH
Comment: 2010 AMB&TOT PM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	130	36	26	26	31	62	42	889	57	104	1001	114
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		10			10			10			10	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	P	LTRP				
SB		L	LTRP	LTRP				
Green (s)	32	3	6	83				
Yellow + All red (s)	5.4	3.8	3.8	5.8				

Cycle (s): 142.8 | Lost time per cycle (s): 18.8 | Critical v/c Ratio: .835

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		175	17		60	34	41	936	44	109	1054	88
Capacity (veh/h)		283	347		306	347	369	1083	912	178	1211	1021
Adjusted saturation flow (veh/h)		1263	1548		1366	1548	1770	1863	1570	1770	1863	1571
v/c ratio		.617	.049		.196	.097	.12	.864	.048	.614	.87	.087
g/C ratio		.224	.224		.224	.224	.643	.581	.581	.711	.65	.65
Average back of queue (veh)		6.9	.5		2	1.1	.7	36.9	.8	2.4	40	1.4
Uniform delay (s)		49.9	43.5		45	43.9	9.3	25.2	12.9	24.3	20.2	9.3
Incremental delay (s)		4.1	0		0	0	0	8.1	0	6.3	7.7	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		54	43.5		45	43.9	9.3	33.3	12.9	30.6	27.9	9.3
LOS		D	D		D	D	A	C	B	C	C	A
Approach delay (s)/LOS	53.1 / D			44.6 / D			31.3 / C			26.8 / C		
Intersection delay (s)/ LOS	31.2 / C											

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB2 PM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB&TOT PM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	138	38	28	28	33	66	45	1043	60	110	1183	121
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	P	LTRP				
SB		L	LTRP	LTRP				
Green (s)	32	3	6	170				
Yellow + All red (s)	5.4	3.8	3.8	5.8				

Cycle (s): 329.8 | Lost time per cycle (s): 18.8 | Critical v/c Ratio: .936

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	1	1	1	1	1
Flow rate (veh/h)		185	19		64	38	47	1098	47	116	1245	96
Capacity (veh/h)		145	213		88	213	363	1378	1163	228	1457	1231
Adjusted saturation flow (veh/h)		1039	1526		630	1526	1770	1863	1573	1770	1863	1573
v/c ratio		1.28	.089		.732	.178	.13	.797	.041	.506	.854	.078
g/C ratio		.139	.139		.139	.139	.778	.74	.74	.821	.782	.782
Average back of queue (veh)		33.7	1.1		4.7	2.2	.8	49.9	.9	2.4	60.4	1.5
Uniform delay (s)		98.9	86.2		94.8	87.3	5.8	18.9	8	28.5	16.4	5.8
Incremental delay (s)		555.9	0		30.6	0	0	3.5	0	1.9	5.5	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		654.8	86.2		125.4	87.3	5.8	22.4	8	30.4	21.9	5.8
LOS		F	F		F	F	A	C	A	C	C	A
Approach delay (s)/LOS	602	/	F	111.3	/	F	21.2	/	C	21.5	/	C
Intersection delay (s)/ LOS	64.6		/						E			

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: NANI KAILU
Analysis Period/Year: AMB3 PM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB&TOT PM SC3 W/ PKWY &4LHW

Intersection Data

Area type: Other | Analysis period: 1 h | Signal type: Actuated-Field | % Back of queue: 70

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	138	38	28	28	33	66	45	1208	60	110	1514	121
RTOR volume (veh/h)			10			30			15			30
Peak-hour factor	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95	.95
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	10			10			10			10		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	P	LTRP				
SB		L	LTRP	LTRP				
Green (s)	40	3	6	90				
Yellow + All red (s)	5.4	3.8	3.8	5.8				

Cycle (s): 157.8 | Lost time per cycle (s): 18.8 | Critical v/c Ratio: .699

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LT	R	L	T	R	L	T	R
No. of lanes		1	1		1	1	1	2	1	1	2	1
Flow rate (veh/h)		185	19		64	38	47	1272	47	116	1594	96
Capacity (veh/h)		320	397		355	397	212	2023	895	203	2243	993
Adjusted saturation flow (veh/h)		1261	1565		1401	1565	1770	3547	1569	1770	3547	1571
v/c ratio		.58	.048		.181	.096	.223	.629	.053	.57	.71	.096
g/C ratio		.253	.253		.253	.253	.626	.57	.57	.688	.632	.632
Average back of queue (veh)		7.8	.7		2.3	1.3	.9	21.3	1	2.8	27.1	1.7
Uniform delay (s)		51.5	44.5		46.1	45.1	11.3	22.7	15	17.6	19.4	11.4
Incremental delay (s)		2.7	0		0	0	0	.6	0	3.8	1.1	0
Initial queue delay (s)		0	0		0	0	0	0	0	0	0	0
Delay (s)		54.2	44.5		46.1	45.1	11.3	23.3	15	21.4	20.5	11.4
LOS		D	D		D	D	B	C	B	C	C	B
Approach delay (s)/LOS	53.3	/	D	45.7	/	D	22.6	/	C	20	/	B
Intersection delay (s)/ LOS	23.8		/						C			

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: AMB1 AM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	182	10	94	20	10	40	88	243	10	20	200	120
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .471

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		209	102		76		96	275		22	348	
Capacity (veh/h)		294	346		331		600	1079		663	1010	
Adjusted saturation flow (veh/h)		1198	1411		1349		1770	1834		1770	1716	
v/c ratio		.711	.295		.23		.159	.255		.033	.344	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.2	2.5		1.8		1	4		.2	5.5	
Uniform delay (s)		35.2	31.3		30.8		6.5	10.2		6	10.8	
Incremental delay (s)		7.8	0		0		0	0		0	0	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		43	31.3		30.8		6.5	10.2		6	10.8	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	39.2 / D			30.8 / C			9.2 / A			10.6 / B		
Intersection delay (s)/ LOS	19.4 / B											

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

18

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: TOT1 AM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 TOT AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	203	10	94	20	10	40	88	273	10	20	212	127
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	55					
Yellow + All red (s)	5	4	5					

Cycle (s): 97 | Lost time per cycle (s): 14 | Critical v/c Ratio: .514

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		232	102		76		96	308		22	368	
Capacity (veh/h)		307	366		347		562	1041		613	973	
Adjusted saturation flow (veh/h)		1192	1419		1347		1770	1836		1770	1716	
v/c ratio		.753	.279		.219		.17	.296		.035	.379	
g/C ratio		.258	.258		.258		.649	.567		.649	.567	
Average back of queue (veh)		6.7	2.4		1.7		1	4.6		.2	5.9	
Uniform delay (s)		33.2	28.8		28.3		7	10.9		6.4	11.6	
Incremental delay (s)		10.1	0		0		0	0		0	0	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		43.3	28.8		28.3		7	10.9		6.4	11.6	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	38.8 / D			28.3 / C			10 / A			11.3 / B		
Intersection delay (s)/ LOS	19.6 / B											

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: AMB1 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	195	10	100	20	10	40	93	272	10	20	224	127
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .307

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		223	109		76		101	307		22	382	
Capacity (veh/h)		293	346		320		572	1080		635	1012	
Adjusted saturation flow (veh/h)		1196	1411		1307		1770	1836		1770	1721	
v/c ratio		.76	.314		.237		.177	.284		.034	.377	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.9	2.7		1.8		1.1	4.6		.2	6.2	
Uniform delay (s)		35.7	31.5		30.9		6.7	10.4		6.1	11.1	
Incremental delay (s)		11	0		0		0	0		0	0	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		46.7	31.5		30.9		6.7	10.4		6.1	11.1	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	41.7	/	D	30.9	/	C	9.5	/	A	10.8	/	B
Intersection delay (s)/ LOS	20		/		B							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

19

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: TOT1 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	213	10	100	20	10	40	93	303	10	20	218	130
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	26	3	55					
Yellow + All red (s)	5	4	5					

Cycle (s): 98 | Lost time per cycle (s): 14 | Critical v/c Ratio: .53

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		242	109		76		101	340		22	378	
Capacity (veh/h)		316	378		358		545	1031		577	963	
Adjusted saturation flow (veh/h)		1193	1423		1351		1770	1837		1770	1716	
v/c ratio		.766	.288		.212		.185	.33		.038	.393	
g/C ratio		.265	.265		.265		.643	.561		.643	.561	
Average back of queue (veh)		7.2	2.5		1.7		1.1	5.4		.2	6.3	
Uniform delay (s)		33.2	28.6		28		7.4	11.6		6.9	12.1	
Incremental delay (s)		10.7	0		0		0	0		0	.1	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		43.9	28.6		28		7.4	11.6		6.9	12.2	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	39.2	/	D	28	/	C	10.6	/	B	11.9	/	B
Intersection delay (s)/ LOS	20		/		B							

HICAP 2000 ™
©Catalina Engineering, Inc

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 AM 2010
Comment: 2010 AMB AM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	192	10	94	20	10	40	88	311	10	20	254	120
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .508

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		209	102		76		96	349		22	407	
Capacity (veh/h)		294	346		331		552	1081		599	1021	
Adjusted saturation flow (veh/h)		1198	1411		1349		1770	1837		1770	1735	
v/c ratio		.711	.295		.23		.173	.323		.036	.398	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.2	2.5		1.8		1	5.4		.2	6.7	
Uniform delay (s)		35.2	31.3		30.8		6.8	10.7		6.2	11.3	
Incremental delay (s)		7.8	0		0		0	0		0	.1	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		43	31.3		30.8		6.8	10.7		6.2	11.4	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	39.2	/	D	30.8	/	C	9.8	/	A	11.1	/	B
Intersection delay (s)/ LOS	18.8		/		B							

1 of 1

HICAP 2000 TM
©Catalina Engineering, Inc.

20

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT2 AM 2010
Comment: 2010 TOT AM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	203	10	94	20	10	40	88	341	10	20	266	127
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	58					
Yellow + All red (s)	5	4	5					

Cycle (s): 100 Lost time per cycle (s): 14 Critical v/c Ratio: .547

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		232	102		76		96	382		22	427	
Capacity (veh/h)		299	353		327		527	1066		564	1006	
Adjusted saturation flow (veh/h)		1194	1414		1308		1770	1838		1770	1734	
v/c ratio		.775	.289		233		.182	.358		.039	.425	
g/C ratio		.25	.25		.25		66	.58		.66	.58	
Average back of queue (veh)		7.1	2.5		1.8		1.1	6		.2	7.2	
Uniform delay (s)		34.9	30.3		29.9		7.1	11.1		6.5	11.7	
Incremental delay (s)		12.1	0		0		0	0		0	.1	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		47	30.3		29.9		7.1	11.1		6.5	11.8	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	43.9	/	D	29.9	/	C	10.3	/	B	11.5	/	B
Intersection delay (s)/ LOS	19.7		/		B							

1 of 1

HICAP 2000 TM
©Catalina Engineering, Inc.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 AM 2016
Comment: 2016 AMB AM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	195	10	100	20	10	40	93	380	10	20	311	127
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .566

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		223	109		76		101	424		22	476	
Capacity (veh/h)		293	346		320		496	1082		538	1027	
Adjusted saturation flow (veh/h)		1196	1411		1307		1770	1839		1770	1746	
v/c ratio		.76	.314		.237		.204	.392		.04	.464	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.9	2.7		1.8		1.1	6.9		.2	8.3	
Uniform delay (s)		35.7	31.5		30.9		7.3	11.2		6.6	11.9	
Incremental delay (s)		11	0		0		0	.1		0	.2	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		46.7	31.5		30.9		7.3	11.3		6.6	12.1	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	41.7 / D			30.9 / C			10.6 / B			11.8 / B		
Intersection delay (s)/ LOS	19.3 / B											

1 of 1

HICAP 2000 ™
©Catelina Engineering, Inc.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT2 AM 2016
Comment: 2016 TOT AM SCEN W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	213	10	100	20	10	40	93	411	10	20	379	130
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .634

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		242	109		76		101	458		22	553	
Capacity (veh/h)		293	346		307		437	1082		511	1034	
Adjusted saturation flow (veh/h)		1195	1411		1251		1770	1840		1770	1758	
v/c ratio		.828	.314		.248		.231	.423		.043	.535	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		7.9	2.7		1.9		1.2	7.7		.2	10.3	
Uniform delay (s)		36.5	31.5		30.9		7.9	11.5		6.8	12.6	
Incremental delay (s)		17.6	0		0		0	.1		0	.5	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		54.1	31.5		30.9		7.9	11.6		6.8	13.1	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	47.1 / D			30.9 / C			10.9 / B			12.9 / B		
Intersection delay (s)/ LOS	20.8 / C											

1 of 1

HICAP 2000 ™
©Catelina Engineering, Inc.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: AMB3AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB AM SCEN3 W/ PKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	195	10	100	20	10	40	93	482	10	20	209	127
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .587

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	LT	R		LTR		L	TR		L	TR	
No. of lanes	1	1		1		1	1		1	1	
Flow rate (veh/h)	223	109		76		101	535		22	365	
Capacity (veh/h)	293	346		320		586	1083		451	1009	
Adjusted saturation flow (veh/h)	1196	1411		1307		1770	1841		1770	1715	
v/c ratio	.76	.314		.237		.173	.494		.048	.362	
g/C ratio	.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)	6.9	2.7		1.8		1.1	9.5		.2	5.8	
Uniform delay (s)	35.7	31.5		30.9		6.6	12.2		7.3	11	
Incremental delay (s)	11	0		0		0	.3		0	0	
Initial queue delay (s)	0	0		0		0	0		0	0	
Delay (s)	46.7	31.5		30.9		6.6	12.5		7.3	11	
LOS	D	C		C		A	B		A	B	
Approach delay (s)/LOS	41.7 / D			30.9 / C		11.6 / B			10.8 / B		
Intersection delay (s)/ LOS	19.4 / B										

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: TOT3 AM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT AM SCEN3 W/ PKWY &4LHWY

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	213	10	100	20	10	40	93	513	10	20	227	137
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .627

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	LT	R		LTR		L	TR		L	TR	
No. of lanes	1	1		1		1	1		1	1	
Flow rate (veh/h)	242	109		76		101	568		22	396	
Capacity (veh/h)	293	346		307		561	1083		426	1009	
Adjusted saturation flow (veh/h)	1195	1411		1251		1770	1841		1770	1716	
v/c ratio	.828	.314		.248		.18	.525		.051	.392	
g/C ratio	.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)	7.9	2.7		1.9		1.1	10.4		.2	6.5	
Uniform delay (s)	36.5	31.5		30.9		6.8	12.5		7.6	11.2	
Incremental delay (s)	17.6	0		0		0	.5		0	.1	
Initial queue delay (s)	0	0		0		0	0		0	0	
Delay (s)	54.1	31.5		30.9		6.8	13		7.6	11.3	
LOS	D	C		C		A	B		A	B	
Approach delay (s)/LOS	47.1 / D			30.9 / C		12.1 / B			11.1 / B		
Intersection delay (s)/ LOS	20.9 / C										

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: AMBI PM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 AMB PM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	180	10	85	15	10	35	120	260	15	55	275	205
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .391

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		207	92		65		130	299		60	522	
Capacity (veh/h)		292	346		351		461	1076		642	999	
Adjusted saturation flow (veh/h)		1192	1411		1431		1770	1829		1770	1698	
v/c ratio		.707	.267		.186		.283	.278		.093	.522	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.1	2.3		1.6		1.6	4.5		.6	9.6	
Uniform delay (s)		35.2	31.1		30.5		7.8	10.3		6.2	12.5	
Incremental delay (s)		7.6	0		0		0	0		0	.5	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		42.8	31.1		30.5		7.8	10.3		6.2	13	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	39.2	/	D	30.5	/	C	9.6	/	A	12.3	/	B
Intersection delay (s)/ LOS	18.1		/		B							

HICAP 2000™
©Cataline Engineering, Inc.

1 of 1

23

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: TOT1 PM 2010 | NB/SB Street: KUAKINI HW
Comment: 2010 TOT PM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Fjeld | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	191	10	85	15	10	35	120	287	15	55	299	214
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .627

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		218	92		65		130	328		60	558	
Capacity (veh/h)		292	346		350		434	1077		617	1001	
Adjusted saturation flow (veh/h)		1190	1411		1428		1770	1831		1770	1702	
v/c ratio		.749	.267		.186		.301	.305		.097	.557	
g/C ratio		.245	.345		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.7	2.3		1.6		1.6	5		6	10.6	
Uniform delay (s)		35.6	31.1		30.5		8.2	10.5		6.3	12.9	
Incremental delay (s)		10.3	0		0		0	0		0	7	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		45.9	31.1		30.5		8.2	10.5		6.3	13.6	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	41.5	/	D	30.5	/	C	9.9	/	A	12.9	/	B
Intersection delay (s)/ LOS	18.8		/		B							

HICAP 2000 ™
©Cataline Engineering, Inc

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: AMB1 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 AMB PM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	185	10	88	15	10	35	127	291	15	55	308	215
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .627

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		212	96		65		138	333		60	568	
Capacity (veh/h)		292	346		350		426	1077		613	1002	
Adjusted saturation flow (veh/h)		1391	1411		1430		1770	1831		1770	1704	
v/c ratio		.726	.277		.186		.324	.309		.097	.567	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.4	2.3		1.6		1.7	5.1		.6	10.9	
Uniform delay (s)		35.4	31.2		30.5		8.4	10.6		6.3	13	
Incremental delay (s)		8.7	0		0		0	0		0	.8	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		44.1	31.2		30.5		8.4	10.6		6.3	13.8	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	40.1	/	D	30.5	/	C	9.9	/	A	13.1	/	B
Intersection delay (s)/ LOS	18.5			/						B		

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

24.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: WALUA RD/O
Analysis Period/Year: TOT1 PM 2016 | NB/SB Street: KUAKINI HW
Comment: 2016 TOT PM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Ficld | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	208	10	88	15	10	35	127	327	15	55	335	228
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	58					
Yellow + All red (s)	5	4	5					

Cycle (s): 100 | Lost time per cycle (s): 14 | Critical v/c Ratio: .684

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		237	96		65		138	372		60	612	
Capacity (veh/h)		297	353		350		385	1063		572	989	
Adjusted saturation flow (veh/h)		1188	1414		1401		1770	1833		1770	1706	
v/c ratio		.798	.271		.186		.358	.35		.105	619	
g/C ratio		.25	.25		25		66	58		.66	.58	
Average back of queue (veh)		7.4	2.3		1.5		1.8	5.8		.6	12.3	
Uniform delay (s)		35.1	30.2		29.5		9.1	11 1		6.6	13.8	
Incremental delay (s)		14.2	0		0		0	0		0	1.2	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		49.3	30.2		29.5		9.1	11.1		6.6	15	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	43.8	/	D	29.5	/	C	10.5	/	B	14.2	/	B
Intersection delay (s)/ LOS	19.9			/						B		

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB12PM 2010
Comment: 2010 AMB PM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	180	10	85	15	10	35	120	313	15	55	333	205
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .63

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		207	92		65		130	357		60	585	
Capacity (veh/h)		292	346		351		414	1078		593	1008	
Adjusted saturation flow (veh/h)		1192	1411		1431		1770	1832		1770	1714	
v/c ratio		.707	.267		.186		.315	.331		.101	.58	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.1	2.3		1.6		1.6	5.5		.6	11.4	
Uniform delay (s)		35.2	31.1		30.5		8.5	10.7		6.4	13.1	
Incremental delay (s)		7.6	0		0		0	0		0	.8	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		42.8	31.1		30.5		8.5	10.7		6.4	13.9	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	39.2 / D			30.5 / C			10.1 / B			13.2 / B		
Intersection delay (s)/ LOS	18.2 / B											

HICAP 2000 ™
©Cataline Engineering, Inc.

1 of 1

25.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT2 PM 2010
Comment: 2010 TOT PM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	191	10	85	15	10	35	120	340	15	55	357	214
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 Lost time per cycle (s): 14 Critical v/c Ratio: .666

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		218	92		65		130	386		60	621	
Capacity (veh/h)		292	346		350		387	1078		569	1010	
Adjusted saturation flow (veh/h)		1190	1411		1428		1770	1833		1770	1717	
v/c ratio		.749	.267		.186		.337	.358		.105	.615	
g/C ratio		.245	.245		.245		.667	.568		.667	.588	
Average back of queue (veh)		6.7	2.3		1.6		1.7	6.1		.6	12.5	
Uniform delay (s)		35.6	31.1		30.5		9	11		6.6	13.5	
Incremental delay (s)		10.3	0		0		0	0		0	1.1	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		45.9	31.1		30.5		9	11		6.6	14.6	
LOS		D	C		C		A	B		A	B	
Approach delay (s)/LOS	41.5 / D			30.5 / C			10.5 / B			13.9 / B		
Intersection delay (s)/ LOS	18.9 / B											

HICAP 2000 ™
©Cataline Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

eneral Information | **Site Information**

alyst	WY	Jurisdiction/Date	3/7/05
ency or Company		EB/WB Street	WALUA RD/O
alysis Period/Year	AMB2 PM 2016	NB/SB Street	KUAKINI HW
mment	2016 AMB PM SCEN2 W/ PARKWAY		

tersection Data

ea type Other Analysis period .25 h Signal type Actuated-Field % Back of queue 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
olume (veh/h)	185	10	88	15	10	35	127	402	15	55	430	215
TOR volume (veh/h)			0			0			0			0
ak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
avy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
art-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
tension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
rival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
pproach pedestrian volume (p/h)	50			50			50			50		
pproach bicycle volume (bic/h)	0			0			0			0		
ft/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

ignal Phasing Plan

LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
3	LTRP							
B	LTRP							
B		L	LTRP					
B		L	LTRP					
reen (s)	25	3	60					
ellow + All red (s)	5	4	5					

ycle (s) 102 Lost time per cycle (s) 14 Critical v/c Ratio .71

tersection Performance

	EB			WB			NB			SB		
ane group configuration		LT	R		LTR		L	TR		L	TR	
o. of lanes		1	1		1		1	1		1	1	
low rate (veh/h)		212	96		65		138	453		60	701	
apacity (veh/h)		292	346		350		329	1080		514	1018	
djusted saturation flow (veh/h)		1191	1411		1430		1770	1835		1770	1731	
/c ratio		.726	.277		.186		.419	.42		.116	.689	
/C ratio		.245	.245		.245		.667	.588		.667	.588	
verage back of queue (veh)		6.4	2.3		1.6		1.9	7.6		.6	15.3	
niform delay (s)		35.4	31.2		30.5		10.5	11.5		6.9	14.5	
ncremental delay (s)		8.7	0		0		.4	.1		0	2	
nitial queue delay (s)		0	0		0		0	0		0	0	
elay (s)		44.1	31.2		30.5		10.9	11.6		6.9	16.5	
OS		D	C		C		B	B		A	B	
pproach delay (s)/LOS	40.1 / D			30.5 / C			11.4 / B			15.8 / B		
tersection delay (s)/ LOS	19.2 / B											

1 of 1

CAP 2000™
atalina Engineering, Inc.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		EB/WB Street	WALUA RD/O
Analysis Period/Year	TOT2 PM 2016	NB/SB Street	KUAKINI HW
Comment	2016 TOT PM SCEN2 W/ PARKWAY		

Intersection Data

Area type Other Analysis period .25 h Signal type Actuated-Field % Back of queue 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	208	10	88	15	10	35	127	438	15	55	457	228
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)	50			50			50			50		
Approach bicycle volume (bic/h)	0			0			0			0		
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s) 102 Lost time per cycle (s) 14 Critical v/c Ratio .764

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		237	96		65		138	492		60	745	
Capacity (veh/h)		291	346		337		299	1080		484	1018	
Adjusted saturation flow (veh/h)		1188	1411		1375		1770	1836		1770	1731	
v/c ratio		.814	.277		.194		.462	.456		.124	.731	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		7.6	2.3		1.6		2	8.5		.6	17.2	
Uniform delay (s)		36.3	31.2		30.5		11.5	11.8		7.2	15.2	
Incremental delay (s)		16.1	0		0		.8	.2		0	2.7	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		52.4	31.2		30.5		12.3	12		7.2	17.9	
LOS		D	C		C		B	B		A	B	
Approach delay (s)/LOS	46.3 / D			30.5 / C			12.1 / B			17.1 / B		
Intersection delay (s)/ LOS	21.1 / C											

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB3 PM 2016
Comment: 2016 AMB PM SCEN3 W/ PKWY & 4LHWY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	185	10	88	15	10	35	127	476	15	55	568	215
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .804

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		212	96		65		138	534		60	851	
Capacity (veh/h)		292	346		350		225	1081		452	1030	
Adjusted saturation flow (veh/h)		1191	1411		1430		1770	1837		1770	1751	
v/c ratio		.726	.277		.186		.614	.494		.132	.826	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		6.4	2.3		1.6		2.4	9.5		.6	22.5	
Uniform delay (s)		35.4	31.2		30.5		15	12.2		7.5	16.8	
Incremental delay (s)		8.7	0		0		4.9	.3		0	5.6	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		44.1	31.2		30.5		19.9	12.5		7.5	22.4	
LOS		D	C		C		B	B		A	C	
Approach delay (s)/LOS	40.1	/	D	30.5	/	C	14	/	B	21.4	/	C
Intersection delay (s)/ LOS	22.1		/			C						

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

27

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT3 PM 2016
Comment: 2016 TOT PM SCEN3 W/ PKWY & 4LHWY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: WALUA RD/O
NB/SB Street: KUAKINI HW

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	208	10	88	15	10	35	127	512	15	55	581	228
RTOR volume (veh/h)			0			0			0			0
Peak-hour factor	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92	.92
Heavy vehicles (%)	2	2	2	2	2	2	2	2	2	2	2	2
Start-up lost time, l_1 (s)	2	2	2	2	2	2	2	2	2	2	2	2
Extension of effective green, e (s)	2	2	2	2	2	2	2	2	2	2	2	2
Arrival type, AT	3	3	3	3	3	3	3	3	3	3	3	3
Approach pedestrian volume (p/h)		50			50			50			50	
Approach bicycle volume (bic/h)		0			0			0			0	
Left/right parking (Y or N)	N	/	N	N	/	N	N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB	LTRP							
WB	LTRP							
NB		L	LTRP					
SB		L	LTRP					
Green (s)	25	3	60					
Yellow + All red (s)	5	4	5					

Cycle (s): 102 | Lost time per cycle (s): 14 | Critical v/c Ratio: .848

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration		LT	R		LTR		L	TR		L	TR	
No. of lanes		1	1		1		1	1		1	1	
Flow rate (veh/h)		237	96		65		138	573		60	879	
Capacity (veh/h)		291	346		337		205	1081		423	1029	
Adjusted saturation flow (veh/h)		1188	1411		1375		1770	1838		1770	1749	
v/c ratio		.814	.277		.194		.673	.53		.141	.855	
g/C ratio		.245	.245		.245		.667	.588		.667	.588	
Average back of queue (veh)		7.6	2.3		1.6		2.6	10.6		.6	24.3	
Uniform delay (s)		36.3	31.2		30.5		16.3	12.6		7.9	17.4	
Incremental delay (s)		16.1	0		0		8.3	.5		0	7.2	
Initial queue delay (s)		0	0		0		0	0		0	0	
Delay (s)		52.4	31.2		30.5		24.6	13.1		7.9	24.6	
LOS		D	C		C		C	B		A	C	
Approach delay (s)/LOS	46.3	/	D	30.5	/	C	15.3	/	B	23.5	/	C
Intersection delay (s)/ LOS	24.6		/			C						

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 AM 2010 | NB/SB Street: QUEEN KAAH
Comment: 2010 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	1		73				260	1111			778	4
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	55	20					
Yellow + All red (s)	5	5	5					

Cycle (s): 95 | Lost time per cycle (s): 10 | Critical v/c Ratio: .781

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	1		79				283	1208			846	4
Capacity (veh/h)	369		330				359	1275			1078	917
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.003		.24				.787	.948			.784	.005
g/C ratio	.211		.211				.684	.684			.579	.579
Average back of queue (veh)	0		1.9				5.7	36.3			19.7	.1
Uniform delay (s)	29.6		31.2				11.3	13.5			15.4	8.4
Incremental delay (s)	0		0				11.1	14.5			3.9	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	29.6		31.2				22.4	28			19.3	8.4
LOS	C		C				C	C			B	A
Approach delay (s)/LOS	31.2	/	C		/		26.9	/	C	19.3	/	B
Intersection delay (s)/ LOS	24.4	/	C									

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

28

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 AM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB AM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	1		77				276	1244			871	4
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	10	95	25					
Yellow + All red (s)	5	5	5					

Cycle (s): 145 | Lost time per cycle (s): 10 | Critical v/c Ratio: .837

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	1		84				300	1352			947	4
Capacity (veh/h)	302		270				425	1413			1220	1037
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.004		.31				.706	.957			.776	.004
g/C ratio	.172		.172				.759	.759			.655	.655
Average back of queue (veh)	0		3.1				6.9	58.5			30	.1
Uniform delay (s)	49.7		52.5				9.7	15.4			17.5	8.6
Incremental delay (s)	0		0				5.3	14.9			3.2	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	49.7		52.5				15	30.3			20.7	8.6
LOS	D		D				B	C			C	A
Approach delay (s)/LOS	52.4	/	D		/		27.5	/	C	20.7	/	C
Intersection delay (s)/ LOS	25.9	/	C									

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB2 AM 2010 | NB/SB Street: QUEEN KAAH
Comment: 2010 AMB AM SCEN2 W/PARKWAY

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	1		73				260	1039			702	4
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	55	20					
Yellow + All red (s)	5	5	5					

Cycle (s): 95 | Lost time per cycle (s): 10 | Critical v/c Ratio: .734

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	1		79				283	1129			763	4
Capacity (veh/h)	369		330				392	1275			1078	917
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.003		.24				.721	.886			.708	.005
g/C ratio	.211		.211				.684	.684			.579	.579
Average back of queue (veh)	0		1.9				5.1	28.9			16.1	.1
Uniform delay (s)	29.6		31.2				10.3	12			14.3	8.4
Incremental delay (s)	0		0				6.4	7.8			2.2	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	29.6		31.2				16.7	19.8			16.5	8.4
LOS	C		C				B	B			B	A
Approach delay (s)/LOS	31.2	/	C		/		19.2	/	B	16.4	/	B
Intersection delay (s)/ LOS	18.7			/			B					

HICAP 2000™
©Catalina Engineering, Inc.

1 of 1

29

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB2 AM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB AM SCEN 2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	1		77				276	1212			837	4
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	10	95	25					
Yellow + All red (s)	5	5	5					

Cycle (s): 145 | Lost time per cycle (s): 10 | Critical v/c Ratio: .817

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	1		84				300	1317			910	4
Capacity (veh/h)	302		270				439	1413			1220	1037
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.004		.31				.684	.932			.745	.004
g/C ratio	.172		.172				.759	.759			.655	.655
Average back of queue (veh)	0		3.1				6.6	52.7			27.5	.1
Uniform delay (s)	49.7		52.5				9.3	14.4			16.9	8.6
Incremental delay (s)	0		0				4.4	11.4			2.5	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	49.7		52.5				13.7	25.8			19.4	8.6
LOS	D		D				B	C			B	A
Approach delay (s)/LOS	52.4	/	D		/		23.6	/	C	19.3	/	B
Intersection delay (s)/ LOS	23			/			C					

HICAP 2000™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB3AM 2016
Comment: 2016 AMB AM SC3 W/ PKWY & 4LHWY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	1		77				276	1471			1071	4
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	20	60	25					
Yellow + All red (s)	5	5	5					

Cycle (s): 120 Lost time per cycle (s): 15 Critical v/c Ratio: .627

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	2			2	1
Flow rate (veh/h)	1		84				300	1602			1164	4
Capacity (veh/h)	365		327				424	2512			1773	792
Adjusted saturation flow (veh/h)	1752		1567				1770	3547			3547	1583
v/c ratio	.003		.256				.707	.638			.656	.005
g/C ratio	.208		.208				.708	.708			.5	.5
Average back of queue (veh)	0		2.5				6.7	16.6			16.6	.1
Uniform delay (s)	37.6		39.7				21.2	9.3			22.3	15
Incremental delay (s)	0		0				5.4	.5			.9	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	37.6		39.7				26.6	9.8			23.2	15
LOS	D		D				C	A			C	B
Approach delay (s)/LOS	39.7	/	D		/		12.5	/	B	23.2	/	C
Intersection delay (s)/ LOS	17.2			/			B					

1 of 1

HICAP 2000 TM
©Catalina Engineering, Inc.

30

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB1 PM 2010
Comment: 2010 AMB PM SCEN 1 W/NO IMPS

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5		104				140	950			1069	10
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)	0						0			0		
Approach bicycle volume (bic/h)	0						0			0		
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	70	20					
Yellow + All red (s)	5	5	5					

Cycle (s): 110 Lost time per cycle (s): 15 Critical v/c Ratio: .858

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	5		113				152	1033			1162	11
Capacity (veh/h)	319		285				296	1355			1185	1008
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.017		.397				.513	.762			.98	.011
g/C ratio	.182		.182				.727	.727			.636	.636
Average back of queue (veh)	.1		3.3				2.2	22.1			44.1	.1
Uniform delay (s)	36.9		39.7				8.9	9.2			19.3	7.3
Incremental delay (s)	0		.2				1.5	2.6			21.4	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	36.9		39.9				10.4	11.8			40.7	7.3
LOS	D		D				B	B			D	A
Approach delay (s)/LOS	39.7	/	D		/		11.6	/	B	40.4	/	D
Intersection delay (s)/ LOS	26.6			/			C					

1 of 1

HICAP 2000 TM
©Catalina Engineering, Inc.

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB1 PM 2016 | NB/SB Street: QUEEN KAAH
Comment: 2016 AMB PM SCEN1 W/NO IMPROVEMENTS

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5		110				148	1064			1197	10
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	140	40					
Yellow + All red (s)	5	5	5					

Cycle (s): 200 | Lost time per cycle (s): 15 | Critical v/c Ratio: .863

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	5		120				161	1157			1301	11
Capacity (veh/h)	350		314				274	1397			1304	1108
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.016		.381				.587	.828			.998	.01
g/C ratio	.2		.2				.75	.75			.7	.7
Average back of queue (veh)	.3		6.1				4.2	47.9			86.3	.2
Uniform delay (s)	64.2		69.3				12.1	16.5			29.8	9.1
Incremental delay (s)	0		.1				3.3	4.3			24.4	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	64.2		69.4				15.4	20.8			54.2	9.1
LOS	E		E				B	C			D	A
Approach delay (s)/LOS	69.2	/	E		/		20.1	/	C	53.9	/	D
Intersection delay (s)/ LOS	38.4			/			D					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information | **Site Information**

Analyst: WY | Jurisdiction/Date: 3/7/05
Agency or Company: | EB/WB Street: HUALALAI R
Analysis Period/Year: AMB2 PM 2010 | NB/SB Street: QUEEN KAAH
Comment: 2010 AMB PM SCEN2 W/ PARKWAY

Intersection Data

Area type: Other | Analysis period: .25 h | Signal type: Actuated-Field | % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5		104				140	872			968	10
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	70	20					
Yellow + All red (s)	5	5	5					

Cycle (s): 110 | Lost time per cycle (s): 15 | Critical v/c Ratio: .79

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	5		113				152	948			1052	11
Capacity (veh/h)	319		285				329	1355			1185	1008
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.017		.397				.462	.7			.888	011
g/C ratio	.182		.182				.727	727			.636	.636
Average back of queue (veh)	.1		3.3				2.1	18.2			32.1	.1
Uniform delay (s)	36.9		39.7				8.1	8.3			16.7	7.3
Incremental delay (s)	0		.2				.8	1.6			8.5	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	36.9		39.9				8.9	9.9			25.2	7.3
LOS	D		D				A	A			C	A
Approach delay (s)/LOS	39.7	/	D		/		9.8	/	A	25	/	C
Intersection delay (s)/ LOS	18.4			/			B					

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB2 PM 2016
Comment: 2016 AMB PM SCEN2 W/ PARKWAY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5		110				148	1024			1146	10
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	5	130	30					
Yellow + All red (s)	5	5	5					

Cycle (s): 180 Lost time per cycle (s): 15 Critical v/c Ratio: .843

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	1			1	1
Flow rate (veh/h)	5		120				161	1113			1246	11
Capacity (veh/h)	292		261				310	1449			1345	1144
Adjusted saturation flow (veh/h)	1752		1567				1770	1863			1863	1583
v/c ratio	.019		.458				.52	.768			.926	.01
g/C ratio	.167		.167				.778	.778			.722	.722
Average back of queue (veh)	.2		5.8				3.2	34.7			61.3	.2
Uniform delay (s)	62.7		67.7				8.7	11			21	7
Incremental delay (s)	0		.9				1.6	2.6			11.1	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	62.7		68.6				10.3	13.6			32.1	7
LOS	E		E				B	B			C	A
Approach delay (s)/LOS	68.3	/	E		/		13.2	/	B	31.8	/	C
Intersection delay (s)/ LOS	24.6				/				C			

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

32

CHAPTER 16 - OPERATIONAL ANALYSIS - SUMMARY WORKSHEET

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB3 PM 2016
Comment: 2016 AMB PM SC3 W/PKWY & 4LHWY

Site Information

Jurisdiction/Date: 3/7/05
EB/WB Street: HUALALAI R
NB/SB Street: QUEEN KAAH

Intersection Data

Area type: Other Analysis period: .25 h Signal type: Actuated-Field % Back of queue: 95

	EB			WB			NB			SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Volume (veh/h)	5		110				148	1189			1477	10
RTOR volume (veh/h)			0						0			0
Peak-hour factor	.92		.92				.92	.92			.92	.92
Heavy vehicles (%)	2		2				2	2			2	2
Start-up lost time, l_1 (s)	2		2				2	2			2	2
Extension of effective green, e (s)	2		2				2	2			2	2
Arrival type, AT	3		3				3	3			3	3
Approach pedestrian volume (p/h)		0						0			0	
Approach bicycle volume (bic/h)		0						0			0	
Left/right parking (Y or N)	N	/	N		/		N	/	N	N	/	N

Signal Phasing Plan

L: LT T: TH R: RT P: Peds

	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
EB			LR					
WB								
NB	LT	LT						
SB		TR						
Green (s)	10	60	25					
Yellow + All red (s)	5	5	5					

Cycle (s): 110 Lost time per cycle (s): 15 Critical v/c Ratio: .718

Intersection Performance

	EB			WB			NB			SB		
Lane group configuration	L		R				L	T			T	R
No. of lanes	1		1				1	2			2	1
Flow rate (veh/h)	5		120				161	1292			1605	11
Capacity (veh/h)	398		356				229	2418			1925	864
Adjusted saturation flow (veh/h)	1752		1567				1770	3547			3547	1583
v/c ratio	.014		.336				.704	.534			.83	.013
g/C ratio	.227		.227				.682	.682			.545	.545
Average back of queue (veh)	1		3.3				3.6	11.4			24.7	.2
Uniform delay (s)	32.9		35.6				27.6	8.8			20.8	11.4
Incremental delay (s)	0		0				9.4	.2			3.2	0
Initial queue delay (s)	0		0				0	0			0	0
Delay (s)	32.9		35.6				37	9			24	11.4
LOS	C		D				D	A			C	B
Approach delay (s)/LOS	35.4	/	D		/		12.1	/	B	23.9	/	C
Intersection delay (s)/ LOS	19				/				B			

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

Traffic Calculations
Unsignalized Intersection
Level of Service (LOS) Calculations

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	2/21/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	EXISTING AM 2004	Minor Street	HUALALAI RD
Comment	2004 EXISTING AM		

Site Information

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		685	4	230	965		1		45			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		761	4	256	1072		1		50			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	50	404	.124	<1	15.2	C	20.2
	2	L	2	28	.073	<1	145.6	F	
	3								C
WB	1								
	2								
	3								
		①							
		④	256	843	.303	1	11.1	B	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB1 AM 2010	Minor Street	HUALALAI RD
Comment	2010 AMBIENT AM SCEN 1W/NO IMPS		

Site Information

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		778	4	260	1111		1		73			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		864	4	289	1234		1		81			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	81	352	.23	1	18.3	C	24.5
	2	L	2	15	.132	<1	278.1	F	
	3								C
WB	1								
	2								
	3								
		①							
		④	289	771	.375	2	12.5	B	

HICAP 2000 TM
©Catalina Engineering, Inc

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB1 AM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB AM SCEN 1 W/ NO IMPS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		871	4	276	1244		1		77			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		968	4	307	1382		1		86			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	86	307	.28	1	21.3	C	32.6
	2	L	2	9	.225	1	517.8	F	
	3								D
WB	1								
	2								
	3								
		①							
		④	307	705	.435	2	14	B	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB2 AM 2010	Minor Street	HUALALAI RD
Comment	2010 AMB AM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		702	4	260	1039		1		73			
PHF		.9	9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		780	4	289	1154		1		81			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	81	394	.206	1	16.5	C	21
	2	L	2	20	.099	<1	203.2	F	
	3								C
WB	1								
	2								
	3								
		①							
		④	289	830	.348	2	11.7	B	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB2 AM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB AM SCEN2 W/PARKWAY		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	R	T	R	
Lane 2	T	L	L	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		837	4	276	1212		1		77			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		930	4	307	1347		1		86			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	86	323	.267	1	20.2	C	29.7
	2	L	2	10	.196	1	439.8	F	
	3								D
WB	1								
	2								
	3								
		①							
		④	307	729	.421	2	13.5	B	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

3.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB3 AM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB AM SCEN 3 W/PKWY &4L HWY		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	R	T	R	
Lane 2	T	T	L	
Lane 3	T	L		

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1071	4	276	1474		1		77			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1190	4	307	1638		1		86			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	86	445	.193	1	15	B	26.4
	2	L	2	9	.223	1	514.8	F	
	3								D
WB	1								
	2								
	3								
		①							
		④	307	575	.534	3	18.4	C	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	2/21/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	EXISTING PM 2004	Minor Street	HUALALAI RD
Comment	2004 EXISTING PM		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		930	10	115	830		5		80			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1033	11	128	922		6		89			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	89	281	.317	1	23.7	C	35.8
	2	L	11	39	.283	1	133.4	F	
	3								E
WB	1								
	2								
	3								
		①							
		④	128	662	.193	1	11.7	B	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB1 PM 2010	Minor Street	HUALALAI RD
Comment	2010 AMB PM SCENI W/NO IMPROVEMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1069	10	140	950		5		104			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1188	11	156	1056		6		116			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	116	228	.508	3	36.8	E	62.1
	2	L	11	21	.518	2	329.3	F	
	3								F
WB	1								
	2								
	3								
		①							
		④	156	579	.269	1	13.5	B	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB1 PM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB PM SCEN1 W/NO IMPROVEMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1197	11	148	1064		5		110			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1330	12	164	1182		6		122			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	122	188	.648	5	57.6	F	121.3
	2	L	11	13	.857	4	827.1	F	
	3								F
WB	1								
	2								
	3								
		①							
		④	164	510	.322	1	15.4	C	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB2 PM 2010	Minor Street	HUALALAI RD
Comment	2010 AMB PM SCEN 2 W/PKWY IMSP		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		968	10	140	872		5		104			
PHF		.9	.9	.9	.9		.9		9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1076	11	156	969		6		116			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	116	265	.437	2	29	D	43.4
	2	L	11	29	.374	2	195.9	F	
	3								E
WB	1								
	2								
	3								
		①							
		④	156	638	.244	1	12.5	B	

HICAP 2000 ™
©Catalina Engineering, Inc

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB2 PM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB PM SCEN 2 W/PKWY IMPS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			L			L				
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1146	11	148	1024		5		110			
PHF		.9	.9	.9	.9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1273	12	164	1138		6		122			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	122	203	.6	4	48.4	E	93.7
	2	L	11	15	.72	3	596.2	F	
	3								F
WB	1								
	2								
	3								
		①							
		④	164	536	.307	1	14.7	B	

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

6.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	QUEEN KAAHUMANU HWY EXT
Analysis Period/Year	AMB3 PM 2016	Minor Street	HUALALAI RD
Comment	2016 AMB PM SC3 W/PKWY &4L HWY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		R			T			R				
Lane 2		T			T			L				
Lane 3		T			L							
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)		1477	11	148	1189		5		110			
PHF		.9	.9	.9	9		.9		.9			
Proportion of heavy vehicles, HV		3	3	3	3		3		3			
Flow rate		1641	12	164	1321		6		122			
Flare storage (# of vehs)									0			
Median storage (# of vehs)							0					

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	122	316	.386	2	23.5	C	52.6
	2	L	6	11	.557	2	642.5	F	
	3								F
WB	1								
	2								
	3								
		①							
		④	164	382	.431	2	21.5	C	

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	4/22/04
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	EXISTING AM 2004	Minor Street	WALUA/ONIONI
Comment	2004 EXISTING AM		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	20	160	85	65	195	10	140	10	60	20	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	178	94	72	217	11	156	11	67	22	11	44
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	67	812	.083	<1	9.8	A	21.5
	2	LT	156	322	.484	3	26.5	D	
	3								C
WB	1	LTR	77	1463	.053	<1	7.6	A	7.6
	2								
	3								A
		①	22	1335	.017	<1	7.7	A	
		④	72	1285	.056	<1	8	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB1 AM 2010	Minor Street	WALUA/ONI ONI
Comment	2010 AMB AM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	20	200	120	88	243	10	182	10	94	20	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	222	133	98	270	11	202	11	104	22	11	44
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	106	748	.142	<1	10.6	B	58.8
	2	LT	200	238	.839	10	84.4	F	
	3								F
WB	1	LTR	99	1224	.081	<1	8.2	A	8.2
	2								
	3								A
		①	22	1276	.017	<1	7.9	A	
		④	98	1198	082	<1	8.3	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT1 AM 2010	Minor Street	WALUA/ONI ONI
Comment	2010 TOT AM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	20	212	127	88	273	10	182	10	94	20	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	236	141	98	303	11	202	11	104	22	11	44
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	106	731	.145	1	10.8	B	86.9
	2	LT	200	218	.916	13	127.2	F	
	3								F
WB	1	LTR	99	1155	.086	<1	8.4	A	8.4
	2								
	3								A
		①	22	1240	.018	<1	8	A	
		④	98	1176	.083	<1	8.3	A	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

8.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2 AM 2010	Minor Street	WALUA/ONI ONI
Comment	2010 AMB AM SCEN2 W/PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	20	254	120	88	311	10	182	10	94	20	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	282	133	98	346	11	202	11	104	22	11	44
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	104	692	.15	1	11.1	B	186.8
	2	LT	200	188	1.061	20	278.2	F	
	3								F
WB	1	LTR	99	1063	.093	<1	8.7	A	8.7
	2								
	3								A
		①	22	1196	.019	<1	8.1	A	
		④	98	1138	.086	<1	8.5	A	

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 AM 2010	Minor Street	WALUA/ONI ONI
Comment	2010 TOT AM SCEN2 W/PARKWAY		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	R	LTR
Lane 2			LT	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	20	266	127	88	341	10	203	10	94	20	10	40
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	22	296	141	98	379	11	226	11	104	22	11	44
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	104	677	.154	1	11.3	B	459.4
	2	LT	226	172	1.313	36	665.6	F	
	3								F
WB	1	LTR	99	1004	.099	<1	9	A	9
	2								
	3								A
		①	22	1163	.019	<1	8.2	A	
		④	98	1118	.087	<1	8.5	A	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

9.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	2/21/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	EXISTING PM 2004	Minor Street	WALUA/ ONI ONI
Comment	2004 EXISTING PM		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	R	LTR
Lane 2			LT	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	220	140	15	195	65	115	10	45	15	10	35
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	61	244	156	17	217	72	128	11	50	17	11	39
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	61	736	.085	<1	10.5	B	22.6
	2	LT	128	281	.456	2	28.4	D	
	3								C
WB	1	LTR	83	1346	.062	<1	7.9	A	7.9
	2								
	3								A
		①	61	1267	.048	<1	8	A	
		④	17	1153	.014	<1	8.2	A	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB1 PM 2010	Minor Street	WALUA/ ONI ONI
Comment	2010 AMB PM SCEN1 W/NO IMPROVEMENTS		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	R	LTR
Lane 2			LT	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	275	203	120	260	15	177	10	85	15	10	35
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	61	306	226	133	289	17	197	11	94	17	11	39
Flare storage (# of vehs)									0			1
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	94	633	.149	1	11.7	B	670.9
	2	LT	200	135	1.485	40	980.8	F	F
	3								
WB	1	LTR	94	998	.094	<1	9	A	9
	2								A
	3								
		①	61	1250	.049	<1	8	A	
		④	133	1031	.129	<1	9	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT1 PM 2010	Minor Street	WALUA/ ONI ONI
Comment	2010 TOT PM SCEN1 W/NO IMPROVEMENTS		

Site Information

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LTR	LTR	R	LTR
Lane 2			LT	
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	299	214	120	287	15	191	10	83	15	10	35
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	61	332	238	133	319	17	212	11	92	17	11	39
Flare storage (# of vehs)									0			1
Median storage (# of vehs)								0			0	

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	94	606	.155	1	12	B	1037.6
	2	LT	212	120	1.773	52	1492.3	F	F
	3								
WB	1	LTR	94	943	.1	<1	9.2	A	9.2
	2								A
	3								
		①	61	1218	.05	<1	8.1	A	
		④	133	997	.134	<1	9.2	A	

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2 PM 2010	Minor Street	WALUA/ ONI ONI
Comment	2010 AMB PM SCEN 2 W/PARKWAY		

Site Information

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	333	203	120	313	15	177	10	83	15	10	35
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	61	370	226	133	348	17	197	11	92	17	11	39
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	92	582	.158	1	12.4	B	1153.5
	2	LT	200	107	1.872	52	1678.4	F	
	3								F
WB	1	LTR	94	894	.105	<1	9.5	A	9.5
	2								
	3								A
		①	61	1189	.051	<1	8.2	A	
		④	133	976	.137	<1	9.3	A	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 PM 2010	Minor Street	WALUA/ ONI ONI
Comment	2010 TOT PM SCEN 2 W/PARKWAY		

Site Information

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LTR			LTR			R			LTR		
Lane 2							LT					
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	357	214	120	340	15	191	10	83	15	10	35
PHF	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9	.9
Proportion of heavy vehicles, HV	3	3	3	3	3	3	3	3	3	3	3	3
Flow rate	61	397	238	133	378	17	212	11	92	17	11	39
Flare storage (# of vehs)									0			1
Median storage (# of vehs)							0			0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 1

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1	R	92	557	.165	1	12.7	B	1641.8
	2	LT	212	94	2.244	64	2348.7	F	
	3								F
WB	1	LTR	94	845	.111	<1	9.8	A	9.8
	2								
	3								A
		①	61	1159	.053	<1	8.3	A	
		④	133	944	.141	<1	9.4	A	

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	2/28/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	EXISTING AM 2004	Minor Street	UOFN NORTH DRIVEWAY
Comment	2004 EXISTING AM		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	270			425	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	300			472	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	569	.069	<1	11.8	B	13.1
	2	L	10	287	.035	<1	18	C	
	3								B
		①	56	1034	.054	<1	8.7	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

12.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB1 AM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 AMB AM SCEN1 W/NO IMPROVEMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	345			425	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	383			472	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	569	.069	<1	11.8	B	13.4
	2	L	10	256	.039	<1	19.6	C	
	3								B
		①	56	1034	.054	<1	8.7	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT1 AM 2010
Comment: 2010 TOT AM SCEN1 W/NO IMPROVEMENTS

Site Information

Jurisdiction/Date: 3/7/05
Major Street: KUAKINI HWY
Minor Street: UOPN NORTH DRIVEWAY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	45	351			524	44				14		40
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	50	390			582	49				16		44
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	44	495	.089	<1	13	B	14.6
	2	L	10	222	.045	<1	21.9	C	
	3								B
		①	50	947	.053	<1	9	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.
1 of 1

13.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: AMB1 AM 2016
Comment: 2016 AMB AM SCEN1 W/NO IMPROVEMENTS

Site Information

Jurisdiction/Date: 3/7/05
Major Street: KUAKINI HWY
Minor Street: UOPN NORTH DRIVEWAY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	376			595	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	418			661	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	444	088	<1	13.9	B	16.2
	2	L	10	186	.054	<1	25.5	D	
	3								C
		①	56	879	.063	<1	9.4	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.
1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT1 AM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 TOT AM SCEN1 W/NO IMPROVEMENTS		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	27	368			549	27				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	30	409			610	30				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	483	.081	<1	13.1	B	14.6
	2	L	10	228	.044	<1	21.5	C	
	3								B
		①	30	939	.032	<1	9	A	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

14.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2 AM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 AMB AM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	399			573	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	443			637	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	459	085	<1	13.6	B	16
	2	L	10	186	054	<1	25.5	D	
	3								C
		①	56	898	.062	<1	9.3	A	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 AM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 TOT AM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	45	405			592	44				14		40
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	50	450			658	49				16		44
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	44	448	.098	<1	13.9	B	16.1
	2	L	10	184	.054	<1	25.7	D	
	3								C
		①	50	887	.056	<1	9.3	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

15.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2AM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 AMB AM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	463			663	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	514			737	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	402	.097	<1	14.9	B	18.3
	2	L	10	146	.069	<1	31.5	D	
	3								C
		①	56	824	.067	<1	9.7	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 AM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 TOT AM SCENT W/ PARKWAY		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	6 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	27	486			707	27				14		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	30	540			786	30				16		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	383	.102	<1	15.5	C	18.6
	2	L	10	148	.068	<1	31.1	D	C
	3								
		①	30	808	.037	<1	9.6	A	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

16.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB3AM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 AMB AM SCEN W/PKWY & 4LHWY		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	361			765	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	401			850	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	346	.113	<1	16.7	C	19.8
	2	L	10	144	.069	<1	31.8	D	C
	3								
		①	56	747	.074	<1	10.2	B	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT3AM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 TOT AM SCEN3 W/PKWY & 4LHWY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	361			765	50				10		35
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	401			850	56				11		39
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	39	346	.113	<1	16.7	C	19.8
	2	L	10	144	.069	<1	31.8	D	
	3								C
		①	56	747	.074	<1	10.2	B	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

17

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	2/28/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	EXISTING PM 2004	Minor Street	UOFN NORTH DRIVEWAY
Comment	2004 EXISTING PM		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	455			330	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	506			367	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	669	.049	<1	10.7	B	12.8
	2	L	10	253	.039	<1	19.8	C	
	3								B
		①	61	1170	.052	<1	8.2	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB1 PM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 AMB PM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	573			470	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	637			522	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	547	.06	<1	12	B	15.6
	2	L	10	169	.059	<1	27.6	D	
	3								C
		①	61	1024	.06	<1	8.7	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

18

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT1 PM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 TOT PM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	LT	TR		R
Lane 2				L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	595			470	26				29		40
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	661			522	29				32		44
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	44	542	.081	<1	12.2	B	15.2
	2	L	10	165	.061	<1	28.2	D	
	3								C
		①	56	1014	.055	<1	8.8	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB1 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 AMB PM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	618			530	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	687			589	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	501	.066	<1	12.7	B	17.2
	2	L	10	143	.07	<1	32.1	D	
	3								C
		①	61	968	.063	<1	9	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

19

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT1 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 TOT PM SCEN1 W/NO IMPROVMENTS		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	40	676			530	26				19		30
PHF	.9	.9			9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	44	751			589	29				21		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	497	.066	<1	12.8	B	17.5
	2	L	10	138	.072	<1	33.1	D	
	3								C
		①	44	957	.046	<1	8.9	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2 PM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 AMB PM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	631			555	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	701			617	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	483	.068	<1	13	B	17.9
	2	L	10	134	.074	<1	33.9	D	
	3								C
		①	61	945	.065	<1	9.1	A	
		④							

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 PM 2010	Minor Street	UOFN NORTH DRIVEWAY
Comment	2010 TOT PM SCEN2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	50	653			523	26				29		40
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	56	726			581	29				32		44
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	44	502	.088	<1	12.9	B	16.6
	2	L	10	139	.072	<1	33	D	
	3								C
		①	56	964	.058	<1	9	A	
		④							

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB2 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 AMB PM SCEN1 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	740			610	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	822			678	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	446	.074	<1	13.7	B	20.6
	2	L	10	104	.097	<1	43.5	E	
	3								C
		①	61	896	.068	<1	9.3	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT2 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	2016 TOT PM SCEN1 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		LT			TR						R	
Lane 2											L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	40	798			642	26				19		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	44	887			713	29				21		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	422	.078	<1	14.3	B	21.9
	2	L	10	95	.105	<1	47.3	E	
	3								C
		①	44	860	.052	<1	9.4	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	AMB3 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	20 AMB PM SC3 W/ PKWY & 4 LANE HWY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	55	878			684	15				25		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	61	976			760	17				28		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	400	.083	<1	14.8	B	25.7
	2	L	10	74	.136	<1	61.5	F	
	3								D
		①	61	835	.073	<1	9.7	A	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

22.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information		Site Information	
Analyst	WY	Jurisdiction/Date	3/7/05
Agency or Company		Major Street	KUAKINI HWY
Analysis Period/Year	TOT3 PM 2016	Minor Street	UOFN NORTH DRIVEWAY
Comment	20 TOT PM SC3 W/ PKWY & 4 LANE HWY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)	LT			TR						R		
Lane 2										L		
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	40	936			716	26				19		30
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	44	1040			796	29				21		33
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	33	378	.087	<1	15.4	C	40.9
	2	L	21	67	.311	1	80.8	F	
	3								E
		①	44	801	.055	<1	9.8	A	
		④							

HICAP 2000 TM
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	TOT1 AM 2010
Comment	2010 TOT AM SCEN 1 W/ NO IMPS

Site Information

Jurisdiction/Date	3/8/05
Major Street	U OF N SOUTH DRIVEWAY
Minor Street	KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	6	365			549	7				7		19
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	7	406			610	8				8		21
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	21	483	.043	<1	12.6	B	14.3
	2	L	7	256	.027	<1	19.5	C	
	3								B
		①	7	957	.007	<1	8.8	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

23.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	TOT1 AM 2016
Comment	2016 TOT AM SCEN 1 W/ NO IMPS

Site Information

Jurisdiction/Date	3/8/05
Major Street	U OF N SOUTH DRIVEWAY
Minor Street	KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	25	357			532	24				16		44
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	28	397			591	27				18		49
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	49	505	.097	<1	12.9	B	14.8
	2	L	16	245	.065	<1	20.7	C	
	3								B
		①	28	957	.029	<1	8.9	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	TOT2 AM 2010
Comment	2010 TOT AM SCEN 2 W/ PARKWAY

Site Information

Jurisdiction/Date	3/8/05
Major Street	U OF N SOUTH DRIVEWAY
Minor Street	KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	6	441			617	7				7		19
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	7	490			686	8				8		21
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) 25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	21	446	.047	<1	13.5	B	15.9
	2	L	7	205	.034	<1	23.2	C	C
	3								
		①	7	897	.007	<1	9	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

24.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY
Agency or Company	
Analysis Period/Year	TOT2 AM 2016
Comment	2016 TOT AM SCEN 2 W/ PARKWAY

Site Information

Jurisdiction/Date	3/8/05
Major Street	U OF N SOUTH DRIVEWAY
Minor Street	KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	25	475			690	24				16		44
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	28	528			767	27				18		49
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	49	401	.122	<1	15.2	C	18.9
	2	L	16	160	.1	<1	30.1	D	C
	3								
		①	28	823	.034	<1	9.5	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT3 AM 2016
Comment: 2016 TOT AM SCEN 3 W/ PKWY & 4LHWY

Site Information

Jurisdiction/Date: 3/8/05
Major Street: U OF N SOUTH DRIVEWAY
Minor Street: KUAKINI HWY

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		T			R						R	
Lane 2		L			T						L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	25	373			792	24				16		44
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	28	414			880	27				18		49
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	49	345	.142	<1	17.2	C	20.4
	2	L	16	159	.101	<1	30.2	D	
	3								C
		①	28	746	.037	<1	10	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

25.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT1 PM 2010
Comment: 2010 TOT PM SCEN 1 W/ NO IMPS

Site Information

Jurisdiction/Date: 3/8/05
Major Street: U OF N SOUTH DRIVEWAY
Minor Street: KUAKINI HWY

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		T			R						R	
Lane 2		L			T						L	
Lane 3												

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	22	602			493	5				6		13
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	24	669			548	6				7		14
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	14	534	.026	<1	11.9	B	16.5
	2	L	7	181	.039	<1	25.7	D	
	3								C
		①	24	1012	.024	<1	8.6	A	
		④							

1 of 1

HICAP 2000 ™
©Catalina Engineering, Inc.

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/8/05
Agency or Company		Major Street	U OF N SOUTH DRIVEWAY
Analysis Period/Year	TOT2 PM 2016	Minor Street	KUAKINI HWY
Comment	2016 TOT PM SCEN 2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		T			R						R	
Lane 2		L			T						L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	58	759			636	30				21		32
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	64	843			707	33				23		36
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	36	434	.083	<1	14	B	28.3
	2	L	21	96	.219	1	52.7	F	
	3								D
		①	64	862	.075	<1	9.5	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst	WY	Jurisdiction/Date	3/8/05
Agency or Company		Major Street	U OF N SOUTH DRIVEWAY
Analysis Period/Year	TOT2 PM 2010	Minor Street	KUAKINI HWY
Comment	2010 TOT PM SCEN 2 W/ PARKWAY		

Input Data

Lane Configuration	SB			NB			EB			WB		
Lane 1 (curb)		T			R						R	
Lane 2		L			T						L	
Lane 3												
	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	22	650			546	5				6		13
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	24	722			607	6				7		14
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2 _____ ft Movement 5 _____ ft

Length of study period (h) .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	14	495	028	<1	12.5	B	18.1
	2	L	7	155	.045	<1	29.4	D	
	3								C
		①	24	962	.025	<1	8.8	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.

1 of 1

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT1 PM 2016
Comment: 2016 TOT PM SCEN 1 W/ NO IMPS

Site Information

Jurisdiction/Date: 3/8/05
Major Street: U OF N SOUTH DRIVEWAY
Minor Street: KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	58	637			525	30				21		32
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	64	708			583	33				23		36
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	36	510	.071	<1	12.6	B	21
	2	L	21	140	.15	1	35.3	E	
	3								C
		①	64	958	.067	<1	9	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.
1 of 1

27

CHAPTER 17 - TWSC - UNSIGNALIZED INTERSECTIONS WORKSHEET

Analysis Summary

General Information

Analyst: WY
Agency or Company:
Analysis Period/Year: TOT3 PM 2016
Comment: 2016 TOT PM SCEN 3 W/ PKWY & 4L HWY

Site Information

Jurisdiction/Date: 3/8/05
Major Street: U OF N SOUTH DRIVEWAY
Minor Street: KUAKINI HWY

Input Data

Lane Configuration	SB	NB	EB	WB
Lane 1 (curb)	T	R		R
Lane 2	L	T		L
Lane 3				

	SB			NB			EB			WB		
Movement	1 (LT)	2 (TH)	3 (RT)	4 (LT)	5 (TH)	6 (RT)	7 (LT)	8 (TH)	9 (RT)	10 (LT)	11 (TH)	12 (RT)
Volume (veh/h)	58	897			710	30				21		32
PHF	.9	.9			.9	.9				.9		.9
Proportion of heavy vehicles, HV	3	3			3	3				3		3
Flow rate	64	997			789	33				23		36
Flare storage (# of vehs)												0
Median storage (# of vehs)										0		

Signal upstream of Movement 2: _____ ft Movement 5: _____ ft
Length of study period (h): .25

Output Data

	Lane	Movement	Flow Rate (veh/h)	Capacity (veh/h)	v/c	Queue Length (veh)	Control Delay (s)	LOS	Approach Delay and LOS
EB	1								
	2								
	3								
WB	1	R	36	389	.093	<1	15.2	C	39
	2	L	21	68	.309	1	79.9	F	
	3								E
		①	64	803	.08	<1	9.9	A	
		④							

HICAP 2000 ™
©Catalina Engineering, Inc.
1 of 1

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of	)	DOCKET NO. A02-737
	)	
AEKO HAWAII, formerly known as U of N BENCORP	)	FIRST AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER FOR A STATE LAND USE DISTRICT BOUNDARY AMENDMENT; EXHIBITS A - B
To Amend the Agricultural Land Use District to the Urban Land Use District for approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island, County and State of Hawaii.	)	

EXHIBIT 6

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of	)	DOCKET NO. A02-737
	)	
AEKO HAWAII, formerly known as U of N BENCORP	)	FIRST AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER FOR A STATE LAND USE DISTRICT BOUNDARY AMENDMENT; EXHIBITS A - B
To Amend the Agricultural Land Use District to the Urban Land Use District for approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island, County and State of Hawaii.	)	

FIRST AMENDED FINDINGS OF FACT, CONCLUSIONS OF LAW, AND DECISION AND ORDER FOR A STATE LAND USE DISTRICT BOUNDARY AMENDMENT

AEKO HAWAII, formerly known as U of N Bencorp, a Hawaii non-profit corporation ("Petitioner" or "AEKO") submitted a State Land Use Boundary Amendment Application on November 21, 2003 ("Original Petition"), and an Amended State Land Use Boundary Amendment Application on December 5, 2003 ("Original Amended Petition"), pursuant to Sections 205-3.1(c) and 205-4, Hawaii Revised Statutes ("HRS"), and Chapter 15-15, Hawaii Administrative Rules ("HAR"), to amend the State Land Use District boundary by reclassifying approximately 62 acres of land situate at Waiaha 1st, Kailua-Kona, District of North Kona, County and State of Hawaii, and designated by Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 ("Property" or "Petition Area"), from the Agricultural Land Use District to the Urban Land Use District to allow for the development of the Hualalai Village condominiums, a multi-function Cultural Center, and a five-acre Educational Facility ("Original Project").

The Land Use Commission ("Commission") issued its Findings of Fact, Conclusions of Law, and Decision and Order in Docket No. A02-737, dated August 8, 2003 ("Decision & Order"), granting the Original Amended Petition and reclassifying the Property from the State Land Use Agricultural District to the State Land Use Urban District, and causing the State Land Use Districts boundaries to be amended accordingly.

Concurrent with submitting its Motion to Amend Petitioner's Name and Amend Caption, seeking Commission approval to recognize Petitioner's change of name to AEKO HAWAII, pursuant to the Articles of Amendment to Change Corporate Name filed May 18, 2005, with the Department of Commerce and Consumer Affairs - Business Registration Division for the State of Hawaii, Petitioner submitted a Motion to Amend Findings of Fact, Conclusions of Law, and Decision and Order ("Motion to Amend"), seeking Commission approval for proposed changes to Petitioner's Original Project and the development of Petitioner's revised project (the "Revised Project").

For the Revised Project, Petitioner sought approval to forgo the commercial portion of the Original Project in favor of providing more faculty and student housing, as well as expanding its academic and recreation facilities.

The Land Use Commission ("Commission"), having considered the entire record on this matter, hereby makes the following First Amended Findings of Fact, Conclusions of Law and Decision and Order. This First Amended Findings of Fact, Conclusions of Law and Decision and Order, upon adoption by the Commission, shall hereby supersede in its entirety the Decision & Order.

FINDINGS OF FACT

PROCEDURAL MATTERS

1. On November 21, 2002, Petitioner filed the Original Petition proposing the development of the Original Project.

2. On December 5, 2002, Commission staff transmitted its comments upon review of the Original Petition, which deemed the Original Petition incomplete.

3. On December 5, 2002, Petitioner filed the Original Amended Petition.

4. On December 6, 2002, the Commission received a facsimile transmission from Petitioner of a letter of intent to intervene from Mr. Lunakanawai Hauanio.

5. On December 20, 2002, Petitioner provided comments and clarification pursuant to the Commission staff's review of the Original Amended Petition.

6. On December 30, 2002, Commission staff deemed the Original Amended Petition as a proper filing pursuant to Section15-15-50, HAR.

7. On January 5, 2003, the Notice of Hearing was published in the Star Bulletin, and West Hawaii Today. The deadline for timely petition to intervene was January 21, 2003.

8. On January 21, 2003, Petitioner filed its witness list and exhibit list identifying Exhibits 1 to 14, filed with the Decision & Order.

9. On January 21, 2003, the County of Hawaii Planning Department ("County") filed its witness list and its Statement of Position in Support of the Petition, and the State of Hawaii Office of Planning ("OP") filed its Statement of Position in Support of the Project.

10. On February 20, 2003, OP filed its witness list and exhibit list, and Exhibits 1 and 2, filed with the Decision & Order.

11. On February 21, 2003, the Commission conducted a field trip to the Petition Area.

12. On February 21, 2003, a prehearing conference was held in Kona. Petitioner filed Exhibit 5, the archaeological inventory survey, filed with the Decision & Order, and Exhibit 15, addendum to its Final Traffic Impact Analysis Report, filed with the Decision & Order.

13. On February 26, 2003, the County filed its exhibit list and Exhibits 1 to 3; filed with the Decision & Order, and OP filed its first amended witness list.

14. On February 27, 2003, Petitioner filed its second amended witness list and second amended exhibit list, and Exhibits 15 to 25, filed with the Decision & Order.

15. On March 5 and 6, 2003, the Commission conducted a hearing on the Original Amended Petition in Kona.

16. On March 5, 2003, the Commission received public witness testimony from Mary Kamahele Boyd, Lunakanawai Hauanio, and Mikahala Roy. The Commission did not receive Mr. Hauanio's written petition to intervene pursuant to Section 15-15-52, HAR, and his verbal request for intervention pursuant to Land Use Commission Rule 15-15-34, HAR, was denied by the Commission on March 5, 2003.

17. On May 16, 2003, Petitioner filed its fourth amended witness list and third and fourth amended exhibit lists, and Exhibits 26 to 35, filed with the Decision & Order.

18. On May 19, 2003, the County filed its first amended witness list and first amended exhibit list, and Exhibits 4 and 5, filed with the Decision & Order.

19. On May 22, 2003, the Commission continued the hearings for the subject docket in Kona.

20. On May 22, 2003, the Commission received public witness testimony from Richard T. Bell, Kathryn Ward-Smith, Curtis Tyler, Dr. William H. Wilson, and Holo Hoopai.

21. On May 22, 2003, Petitioner filed Exhibit 36, filed with the Decision & Order.

22. On May 22, 2003, OP filed its second amended witness list and second amended exhibit list, and Exhibit 4, filed with the Decision & Order.

23. On May 23, 2003, Petitioner filed its Exhibits 37 and 38, filed with the Decision & Order.

24. On May 23, 2003, OP filed its Exhibit 5, filed with the Decision & Order.

25. On June 9, 2003, the County filed its second amended witness list and Exhibits 6 and 7, filed with the Decision & Order.

26. On August 8, 2003 the Commission issued the Decision & Order, reclassifying the Petition Area from the State Land Use Agricultural District to the State Land Use Urban District subject to the conditions set forth in the Decision & Order.

27. On August 18, 2003, Petitioner recorded in the Bureau of Conveyances of the State of Hawaii the conditions set forth in the Decision & Order.

28. On December 21, 2006, the Petitioner, by and through its attorney Jennifer A. Benck, filed two motions: (1) a Motion for Order to Change Petitioner's Name and Amend Caption to reflect a corporate name change from U of N Bencorp to AEKO HAWAII; and (2) a Motion to Amend Findings of Fact, Conclusions of Law, and Decision and Order, to reflect the Petitioner's decision to forgo the commercial portion of the Original Project, and pursue development of the Revised Project.

DESCRIPTION OF THE PROPERTY

29. The Property is located on the west coast of the Island of Hawaii, approximately one mile southeast of the town center of Kailua-Kona, on the lower western slopes of Mount Hualalai at an elevation ranging from approximately 100 to 325 feet.

30. The Property is bordered by Kuakini Highway on the west, Queen Ka`ahumanu (Queen K) Highway and Hualalai Road on the east, the University of the Nations-Kona ("U of N") campus on the north, and the Kona Hillcrest subdivision on the south.

31. The Property is generally gently sloped, with steeper slopes (approaching 25 percent) on the upper mauka side just below Hualalai Road.

32. The Property comprises approximately 62 acres, and two tax map parcels: TMKs (3) 7-5-10:85 and 7-5-17:6.

Soils and Geology

33. The Property comprises two soil groups. The Soil Conservation Service's *Soil Survey of the Island of Hawaii, State of Hawaii*, locates a narrow band of Honuaulu extremely stony silty clay loam ("HVD") along the mauka border of the property. The Honuaulu series consists of well-drained silty clay loams that formed in volcanic ash. The HVD soil subtype is generally found with stones covering 3-15% of the area and with slopes of 12-20%. Its typical use is for growing of coffee or macadamia nuts (at higher elevations than the Property), or pasturage.

34. The vast majority of the Property is Punalu`u extremely rocky peat ("rPYD") with slopes of 6-20%. The Punalu`u Series consists of well-drained, thin organic soils over pahoehoe lava bedrock. Soils of this type are used for pasturage. The peat is rapidly permeable; the underlying lava is very slowly permeable, with runoff slow and erosion hazard slight.

35. The ground surface is very broken with heaps of sharp broken lava rock appearing more like a`a than the smooth pahoehoe. These fragments have been piled, apparently by hand, to facilitate cattle grazing. The potential for agricultural productivity is low.

Agricultural/ALISH/Land Study Bureau Classification

36. The agricultural potential for the Property is generally poor because of the shallow, rocky soil type. None of the Property is classified as within "agricultural lands of importance to the State of Hawaii" (ALISH). The ALISH classification system contains four categories: prime, unique, other important agricultural lands, and unrated. The Property is classified as unrated. The nearest rated ALISH parcel is roughly three-quarters of a mile south.

37. The Land Study Bureau map classification for the Property is "E", or very poorly suited for agricultural productivity.

Climate

38. The climate of the Island of Hawaii is characterized by remarkable differences in rainfall over short distances, mild temperatures, persistent northeasterly trade winds, and distinct climatic regimes in locales sheltered from the prevailing winds. The Property is on the leeward side of the Big Island, at a low elevation, and thus receives relatively little precipitation.

39. Yearly rainfall at the nearest weather station (Holualoa Beach) averages around 28 inches, and is spread relatively evenly throughout the year. At this station, in August, the month of greatest average precipitation, averages 3.33 inches and December, the month with least rainfall, 1.6 inches. The property is on the 750-mm isohyet, equal to approximately 29.5 inches per year.

40. Temperatures are similarly fairly constant, with the daily highs averaging between 80 and 85 degrees (with the highest temperatures from August to October), and the lowest temperatures ranging from 64 to 70 degrees Fahrenheit, with the coolest temperatures in January and February.

41. The local daily solar heating and nightly cooling results in ocean breezes flowing up the slopes in the daytime and cooling mountain breezes blowing toward the ocean in the evening. The site plan orients the condominium units so as to catch these breezes and utilize passive cooling techniques.

PROPOSAL FOR DEVELOPMENT

The Original Project

42. The Original Project was comprised of three separate developments: 1) Hualalai Village; 2) the Cultural Center; and 3) an Educational Facility.

43. Hualalai Village, a 400-unit market condominium complex, was to be developed in four stages. Phase I (103 units) was already zoned and under construction, and was not a part of the Original Petition or the Original Amended Petition. The remaining 297 units of the planned Hualalai Village were to be contained in Phases II, III and IV.

44. The Cultural Center was planned to have on-going outdoor daytime performances. The Cultural Center included an indoor performance theater, outdoor water feature, educational living museum complex, restaurant and shops. A total of approximately 28,900 square feet of the 49,400 square foot Cultural Center was planned for commercial uses.

45. No specific development plans were in place for the Educational Facility, which was allotted approximately 5.0 acres of the 62 acre Property.

The Original Project - The Hualalai Village

46. Hualalai Village, a 400-unit condominium complex, was planned to be developed in four stages, with Phase I (103 units) already zoned and under construction, and not part of the Original Petition or the Original Amended Petition.

47. The remaining three phases of Hualalai Village were planned to consist of approximately 297 high-quality condominium units in approximately 21 two- and three-story structures distributed over approximately 31 acres. There were plans for a recreation center with exercise facilities and a pool. The structures were planned to be made of steel and stucco, and would have been built with no party walls, non-creak floors, and a variety of available interior layouts and appointments. The buildings would have been oriented to take advantage of makai views to the ocean and Kailua Bay, and the mauka-makai breezes. The condominium units were planned to range in size from one to four bedrooms, and in price from $167,500 to $502,500.

48. Construction of Hualalai Village was planned to proceed in phases and sub-phases, with each phase significantly pre-sold before construction began. Ground was broken on Hualalai Village phase 1A in early May, 2002, and 75% of the planned units pre-sold.

49. Two different market segments were to be served by Hualalai Village: (i) U of N affiliates, including donors and friends, faculty and staff, and some students; and (ii) the general public. The two sectors would have been financially segmented, with friends and donors of the U of N and the target general public being relatively more able to purchase units, and faculty, staff and students relatively less able to purchase units. There was an intention to aid less affluent U of N affiliates, as well as staff, to purchase within Hualalai Village

50. There was an intent to provide some student housing units within Hualalai Village.

51. Within the normal market segment, market data and research indicated strong demand for the Hualalai Village component of the Original Project.

52. It was anticipated that Hualalai Village would benefit Kailua-Kona by helping satisfy the demand for high-quality condominium residences, and by helping to meet the needs of friends and staff of the U of N for housing close to the campus.

53. The landscape plan for Phases II - IV of Hualalai Village would have maintained the style and pattern followed in Phase I. Similar plant species were to be utilized to provide a continuity of visual pattern and texture. The selection of plant material would have had a stronger emphasis on native species: endemic, indigenous and Polynesian introduced, either coastal species or species that are found in the dry mesic forest of the original Hawaiian landscape.

54. Net revenues generated from the Hualalai Village would have flowed through Bencorp to be used to benefit the U of N.

The Original Project - The Cultural Center

55. The Cultural Center was planned as a first-class visitor destination, intended to present the authentic story of the native Hawaiian culture and its historical relationship with the introduction of Christianity, its impact upon the monarchy, the people of Hawaii, and the region of Kona, with references to traditional cultures from Pacific regions that have combined to produce Hawaii's unique multicultural mosaic. These stories would have been told through on-going daytime performances in outdoor performance area(s) and an enclosed performance auditorium. Other aspects of the Cultural Center included an outdoor water feature, an educational living museum complex, a restaurant, and shops. The performances would have lasted approximately 20 minutes, and the entire Cultural Center would have been experienced in

approximately two and one-half hours. The water feature was planned to provide water-based activities and a Hawaiian sense of place.

56. The Cultural Center would have provided education and entertainment related to different elements of native Hawaiian culture and history. It was anticipated that the Cultural Center facilities, including the auditorium, would have been made available for community use, such as for concerts.

57. The Cultural Center would have benefited Kailua-Kona by providing a needed venue and visitor attraction in the Kona region that respected, educated, and told the story of Hawaii's cultures, thus building respect for, and awareness of, cultural diversity as well as similarity across cultures. It was anticipated that the Cultural Center would have appealed to families and across generations.

58. The Cultural Center would have enhanced the exposure of U of N students to native Hawaiian and Pacific cultures.

59. Net revenues generated by the Cultural Center would have flowed through Bencorp to be used to benefit the U of N.

60. The preliminary site plan devoted approximately 26.5 acres to the Cultural Center including parking to accommodate 15 tour buses and up to 840 cars which were anticipated to arrive daily at the Cultural Center.

61. Economically, the Cultural Center would have enhanced the Kailua-Kona community as a significant new visitor attraction. The Cultural Center would have added to the region's economic stability and economic growth by bringing a constant flow of income to the region. By helping to facilitate the continued growth of the U of N, it was anticipated that the income would have fueled the arrival of a growing student population from the U.S. mainland

and elsewhere, contributing to growth in the local and regional economy. The construction of the Cultural Center would have resulted in temporary, and some permanent, additions to local employment.

62. Ongoing operations at the Cultural Center were anticipated to provide a continued demand for local goods and services, and a supply of new and steady jobs, the income from which would have circulated through the region on a continuing basis. In the absence of any comparable attraction in the Kona region or on the Big Island, the Cultural Center would have added a new dimension to the attractiveness and economy of the region while not competing with any similar existing enterprise.

63. Based upon the feasibility assumption prepared by Steven Au and Roy Tokujo, between 500-1,100 visitors per day were projected to visit the Cultural Center. Cruise line passengers would have been shuttled via buses from the pier to the Cultural Center and would have represented approximately 75% of the daily visitor count to the Cultural Center. Fifty (50) tour patrons were expected to arrive by van transport, 50 kamaaina, and 200 independent travelers were expected to arrive by private automobiles.

64. Socially, the primary programmatic goals of the Cultural Center were to introduce and educate visitors and local families to the authentic story of the native Hawaiian culture and its historical relationship with the introduction of Christianity, its impact upon the monarchy, the people of Hawaii and the region of Kona. Inherent in this telling was how Christianity changed the Hawaiian culture to promote respect for differences among cultures and the value of community. It was planned that the Cultural Center would do this through a set of experiences that were fun, intellectually and creatively stimulating, and appealing to families and across generations.

65. It was anticipated that the Cultural Center facilities would have been open to the community, and would have provided a new and high quality performance venue for Kailua-Kona. As planned, the main performance area was situated on site as far as possible from any existing or planned residential areas, and would have been completely enclosed.

66. Educationally, the Cultural Center would have offered local residents, and particularly local schoolchildren, the opportunity to deepen their understanding of their own culture by seeing it in its traditional form and by experiencing the range of traditional cultures that produced Hawaii's present cultural amalgam. Student educational events would have been scheduled on "non-ship arrival" days and during the normal hours of operations.

67. The landscape plan for the Cultural Center would have focused on education. Remnants of the previous agricultural features that could have been preserved would have been preserved. Plantings related to Hawaiian agriculture would have been planted to model the dry mesic forest of olden times.

68. A two to three acre passive park was planned for the area between the Hualalai Village and the Cultural Center. The park was sited adjacent to the existing Hillcrest Community Park. Walking paths and recreational landscaping would have been provided. Native species and Polynesian introductions suited to the area would have been emphasized in the park landscaping

The Original Project - Educational Facility

69. The Original Project would have had an approximately five (5) acre Educational Facility. The exact site plan and configuration had not been determined at the time of the Original Petition. This site was an exchange area for land previously transferred from the U of N to Hualalai Village to facilitate the development schedule.

The Revised Project

70. The Revised Project consists of three separate developments which are intended to link the Property to the original U of N Campus Master Plan. The Petitioner represented that the Revised Project should have significantly less impact on the socio-economic, natural, historic, and environmental resources than was expected under the Original Project. The 3 components of the Revised Project are the: 1) Staff Housing Community; 2) Student Villages; and 3) Expanded Academic and Recreation Facilities.

71. In total, the Revised Project will eventually provide up to approximately 400 housing units. The Staff Housing Community is expected to provide up to 100 residential condominium units available for sale to U of N staff and up to 6 single family homes to be available for purchase by U of N leaders. The three Student Villages are expected to provide up to 300 rental units, of which approximately forty percent (40%) of the units (up to 120 units) will be available for staff, and sixty percent (60%) of the units (up to 180 units) will be available for students.

72. The Expanded Academic and Recreation Facilities will consist of academic buildings and sports and recreation facilities.

The Revised Project- Staff Housing Community

73. A range of apartments will be available in the Staff Housing Community. The anticipated mixture will include studios, and 1, 2 and 3 bedroom units. Up to 100 units are planned for the Staff Housing Community. The architectural character of the Staff Housing Community will compliment the existing, adjacent, Phase I of the Hualalai Village. In addition to the Staff Housing Community, Petitioner intends to construct up to 6 single family homes for purchase by U of N leaders.

74. The Staff Housing Community will be built in structures of one to three stories.

75. The Staff Housing Community will be designed to serve the needs of more senior staff who have "settled down" and desire permanent housing in Kona.

76. Development of the Staff Housing Community is anticipated to commence in 2008. Development will proceed pursuant to demand, which at this time is strong.

77. Similar to the Original Project, the philosophy of the Revised Project is to "build to the land," by avoiding major cuts and fills. The Revised Project will be designed to facilitate pedestrian access, and with a lower density (RM-4) than the site allows. This is to provide a better quality of life for residents over the long term. The landscaping and design throughout the development will encourage residents to leave their cars at home and walk to and from Kailua Village, as well as to the adjacent U of N campus.

78. It is planned that units within the Staff Housing Community will be offered at approximately 30% below market rates. This reduced cost is possible in part because Petitioner does not face land acquisition costs in the development of the Revised Project.

79. The Staff Housing Community will benefit Kailua-Kona by providing below market price housing for U of N staff, thereby freeing more off-site housing for local families.

80. The landscape plan for the Staff Housing Community will mesh with the style and pattern followed in Phase I of Hualalai Village. Similar plant species will be utilized to provide visual continuity. The selection of plant material will include native species (endemic, indigenous and Polynesian introduced), either coastal species or species that are found in the dry mesic forest of the original Hawaiian landscape.

The Revised Project - Student Villages

81. The Student Villages will consist of up to 300 units available for rent by students and staff, and will be clustered in 3 Villages (Villages 5, 6, and 7), constructed in a style similar to that of the Villages planned for the original 41 acre U of N campus.

82. Classrooms will be imbedded throughout the Student Villages. The Student Villages concept is "live, learn and work" meaning students and staff will both live and study in the Villages.

83. The Student Villages will benefit Kailua-Kona by providing affordable rental housing for U of N students and staff, thereby freeing off-site low cost housing for local families.

84. The landscape plan for the Student Villages will be similar to the plans already developed for Village 2 located on the original U of N campus and currently under construction.

The Revised Project - Expanded Academic and Recreation Facilities

85. The Expanded Academic and Recreation Facilities consist of: 1) the College of Arts and Communications; 2) the College of Education; 3) a Commons with Multi-Purpose Gymnasium; and (4) Sports Facilities.

86. College of Arts and Communications.

87. The College of Arts and Communications will be a two-story building with a performance arts complex with seating capacity for 800 - 1,000 people, a stage, studios, and offices.

88. College of Education.

89. The College of Education will include a model Education Center with a teaching laboratory, library, science room, shop room, and administration offices. Playground areas and green courtyards will be provided.

90. An Education Center has long been desired on the U of N campus to provide teaching education to the students of the U of N, and a coherent and continuous learning environment for the children of U of N staff, as well as for those students who have attended the existing U of N pre-school. It is anticipated that the Education Center may eventually be expanded to provide educational opportunities for children from pre-school through high-school.

91. Students at the Education Center will include the children of staff in addition to students from the Kailua-Kona community.

92. Commons Area with Multi-Purpose Gymnasium.

93. The Commons Area with Multi-Purpose Gymnasium will include a 1-story building with mezzanine. The Gymnasium floor will have 2 courts, a stage and backstage. The Multi-Purpose Gymnasium will provide seating for approximately 1,200, and will include classrooms, offices, lockers, restrooms and lobbies.

94. The Commons Area with Multi-Purpose Gymnasium will serve the U of N campus in general, and will provide a venue for special events for the larger Kailua-Kona community.

95. Sports Facilities.

96. The Sports Facilities will consist of soccer, football, and softball fields, bleachers, a track, tennis courts, volleyball courts, a walking or running "vita course" with exercise stations around the campus, and an Olympic swimming pool with showers and lockers.

DEVELOPMENT TIMETABLE

97. The development timetable for the Revised Project will be affected by a number of factors, including market conditions and student enrollment. The development timetable is given based upon the growth in student enrollment now occurring, i.e., twelve percent (12%) per annum, projected into the future. Thus, subject to the foregoing, the following is the projected development timetable of the Revised Project.

98. Construction of the Staff Housing Community is proposed to begin in 2008 and be completed in 2014.

99. Construction of the Student Villages is proposed to begin in 2010 and be completed by 2016.

100. Construction of the Expanded Academic and Recreation Facilities is expected to begin on a phased basis starting in 2007, with the volleyball courts, soccer, football and softball fields, track and bleachers to be completed first, followed by the tennis courts and vita course, and later the Olympic swimming pool with locker and showers. Concurrent with the development of the sports fields, construction of the academic buildings is planned, also on a phased basis starting with the College of Education, to be followed by the Multi-Purpose Gymnasium, and next the College of Arts and Communications. Construction of the Expanded Academic and Recreation Facilities is expected to be completed by 2016.

PETITIONER'S FINANCIAL CAPABILITIES TO UNDERTAKE THE PROPOSED DEVELOPMENT

101. Petitioner was established in 1985, as a non-profit tax-exempt 501(c)(2) benefit corporation for the purpose of providing financial and material support to the U of N, a Hawaii 501(c)(3) non-profit corporation.

102. For the Original Project, the Petitioner obtained special purpose niche financing.

103. For the Original Project, Petitioner and the parent organization for the Cultural Center would have provided necessary financial statements to assist in the procurement of financing. Initial capital monies would have been raised by donations, private investors, and/or conventional financing.

104. For the Original Project, primarily through niche and conventional financing and contributions from U of N affiliates, including donors and friends, faculty and staff, and some students, approximately $20.5 million was received for the development of Hualalai Village.

105. For the Revised Project, Petitioner will provide necessary financial statements to assist in the procurement of financing. Initial capital monies may be raised by donations, private investors, and/or conventional financing. A current financial statement of the Petitioner is attached hereto as Exhibit "A" and incorporated herein by reference.

STATE AND COUNTY PLANS AND PROGRAMS

106. The State Land Use Commission currently classifies the Property in the Urban District.

107. The Property is surrounded on three sides by lands in the Urban District classification. Abutting the Property on the north, the existing U of N campus is in the Urban District classification and zoned RM-4 and a 2.729 acre parcel zoned RM-2. Bordering the Project area to the south is the Kona Hillcrest subdivision, classified in the Urban District and zoned RS-7.5; there is also a narrow parcel owned by Petitioner that is in the Urban District and split-zoned RD-3.75 and RS-7.5. To the west, across Kuakini Highway lies a parcel classified Urban and zoned CV-10. To the east, across Queen Ka'ahumanu Highway lie parcels zoned

Agricultural 5a and Agricultural 1a; nearby, the planned Pualani Subdivision is classified in Urban District and zoned RS-15.

108. The County of Hawaii General Plan, in its Land Use Pattern Allocation Guide (LUPAG) Maps, designates the Property as Medium Density Urban. This designation includes "village and neighborhood commercial and residential and related functions (3-story commercial; residential -- up to 35 units per acre)."

109. The Property is not within the Special Management Area established by the County of Hawaii pursuant to Chapter 205A, Hawaii Revised Statutes.

110. The Property is currently zoned Agricultural 1a. The Petitioner will seek a change of zone to RM-4, or possibly Residential-Commercial Mixed use or Village Commercial to facilitate development of the Revised Project.

111. The Kona Regional Plan was adopted by the Planning Commission of the County of Hawaii as Resolution No. 184 in April 1984, and designates the Property as Medium Density Urban RES 6 (6 units per acre). The Revised Project is consistent with this designation.

112. The Office of State Planning developed the West Hawaii Regional Plan ("Plan") in November 1989. The Plan identifies the Property as falling within the Keahole-Keauhou Resort Destination Node. The Revised Project is consistent with the policies of clustering resort development within designated resort destination nodes, developing employment opportunities within those nodes, and encouraging the County to use its zoning powers to support the development of those nodes.

113. The Kailua-Kona Master Plan was adopted in 1994, to help advise the Hawaii County Planning Director and guide urban design in the Kailua Village area, which includes the project area. The Kailua-Kona Master Plan lists the Property as low-density

residential in its entirety. The Revised Project is consistent with the objectives of the Kailua-Kona Master Plan.

114. The Revised Project is located within the boundaries of the Kailua Village Special District. The plans for Hualalai Village, Phase I, were reviewed and approved by the Kailua Village Design Commission, and Phase IA has been completed.

115. The Keahole to Kailua Development Plan (K to K Plan) was adopted by resolution by the Hawaii County Council in April 1991. The K to K Plan serves as an implementing tool for the County General Plan and as a flexible guide for the future growth and development of an area of approximately 17,000 acres in the North Kona District extending from the Kau ahupuaa to the north, Mamalahoa Highway to the east, Palani Road and Kailua Village to the south, and the shoreline to the west. The Revised Project will result in little additional traffic because the Student Villages and Staff Housing Community will absorb the housing needs created by increased enrollment and expansion at the U of N, thus eliminating commuter traffic. According to the Traffic Impact Analysis Report by M&E Pacific, Inc., dated November 2006 (the "2006 TIAR"), the Revised Project is not expected to have any impact on existing traffic conditions. The critical turning movements at the unsignalized intersections on Kuakini Highway and Queen Ka`ahumanu Highway Extension are forecast to operate at acceptable levels of service with all three proposed projects in place with no mitigating measures required.

NEED FOR PROPOSED DEVELOPMENT

116. A feasibility study was performed to determine the strength of market demand for the condominium units proposed in the Original Project. The research examined historical data, interviews with local real estate agents, unit qualitative analysis, and internal needs assessments. Two market segments were considered: (a) affiliates of the U of N, including

donors, friends, faculty, staff, and students; and (b) the general public and faith-based audiences. The study found a strong demand for the Original Project. Extrapolating from that study, there continues to be strong demand for the staff and student housing that is proposed for the Revised Project.

Demand from University affiliate.

117. Bencorp was formed in 1985 as a 501(c)(2) non-profit benefit corporation serving the development of the U of N. The U of N is a mission-based educational institution, founded in Kona in 1977, and now actively involved in equipping men and women in more than 140 nations through field driven course work within its seven colleges and focused centers.

118. Over the last three decades, through both the educational and physical development of the campus, tens of thousands of lives have been impacted, and have in turn identified with, and invested in, the mission and vision of the U of N. These include parents who have sent their children to the U of N, thousands of volunteers who have labored in the building and staffing of the facilities, and a growing constituency of donors. There has been a significant and growing demand among faculty, staff and students for housing opportunities near the Kona campus. These requests are not investment oriented. Rather, they represent the intention and commitment to engage on a part or full-time basis with the U of N. Thus, there is an ongoing demand for adequate and appropriate housing that addresses the needs of the U of N faculty and staff, while allowing those individuals to fulfill the primary mission of serving the U of N. Moreover, the U of N is projected to continue to grow, continuing the related growth in demand for residences and accommodations convenient to the campus.

119. There is a strong need for both owner-occupied and rental housing in Hawaii County, especially in the Kailua-Kona area, particularly at the lower income levels, due to the rising median prices on the Big Island.

120. Prices for most units within the Staff Housing Community will offered to U of N staff at prices approximately 30% below market. Although some units may be offered at market prices, a significant number of the units are anticipated to fall within the affordable housing price range established by the County of Hawaii. Due to the over-all affordability of the units, the Revised Project will not contribute to rising home prices within the Kailua-Kona area.

121. The anticipated unit buyer within the Staff Housing Community will have a median family income of $28,000-$41,000 per year, be between 35 to 65 years of age, and be working for, or closely affiliated with, the U of N.

122. The Staff Housing Community will reduce housing pressure on the Kailua-Kona community overall. The Revised Project will provide suitable housing for staff and faculty, thereby removing that segment of home buyers from the general population and leaving more housing available for the general community.

123. The Staff Housing Community will be subsidized by the U of N, thereby increasing the overall number of reasonably priced housing units available in the Kailua-Kona area.

124. In general, the Staff Housing Community will offer high-quality housing that reinforces the Kona way of life by avoiding over-density, building to the land, and encouraging a walkable, pedestrian friendly community. The Revised Project will help to satisfy the demand for owner-occupied housing in the Kona area, and the special need for housing to serve staff, friends, donors, and affiliates of the U of N.

125. Each Student Village is expected to provide up to 100 rental units, for a total of up to 300 low-cost rental housing units to be available for students and staff. In addition to housing units, each Village will include classrooms, offices and a library.

126. The Student Villages will be subsidized by the U of N, resulting in rental units being offered well below market rates. This affordability and convenience should lead to increased availability of rental housing units in the general community, as students and staff who currently rent outside of the campus move into the Student Villages.

Expanded Academic and Recreation Facilities.

127. The Kona coast has relatively few facilities for education and recreation. The Expanded Academic and Recreation Facilities will provide the community new destinations for theater performances and spectator sports. The College of Education within the Revised Project will include a model laboratory Education Center. The Education Center will combine student education with teacher training and curriculum development. It will provide the Kailua-Kona area with increased educational opportunities for children and adults.

128. The Kona region has experienced strong growth over the last decade, and is in need of additional venues for concerts and other performances. Petitioner is committed to strong interaction with the community and support for community activities. The College of Arts and Communications performance theater can help meet the demand for new arts and performance facilities.

129. The Revised Project may provide short-term employment in the areas of development, construction, financing, architecture, engineering, insurance, accounting, law, and other related employment relative to the development, and in the operation of the Sports and Recreation Facilities. Full and part-time job opportunities may be created in the areas of

administration, staff support, accounting, finance, customer service, security, property management, personnel, production and promotion, clerical, landscape maintenance, janitorial services, and marketing and advertising.

130. At any one time, the U of N hosts students from 30 – 50 nations. The U of N makes a significant contribution to cultural diversity as well as training in cross-cultural relationships. The Staff Housing Community and Student Villages will be closely linked to the U of N, and will provide much needed additional housing units for the staff and students. As consumers, U of N staff and students make a substantial contribution to the Kona economy.

SOCIO-ECONOMIC IMPACTS

Population

131. In 1980 there were 13,748 people living in the region of North Kona. By 2000, the population had more than doubled to 28,543. The population increase from 1990-2000, was 28.1%. The population of the Kailua CDP increased just 8% from 1990-2000, to 9,870, but the Holualoa CDP, the one closest to the Property, increased by 59.3% over that time, to 6,107. Together this local population equals 15,977.

132. In 2000 Hawaii County per-capita income was $18,791. In Kailua-Kona it was $20,353, while in Holualoa it was $25,222, which is 22% higher than Kailua, and 39% higher than Hawaii County. This statistical picture of Kailua-Kona demonstrates that the area is slightly better off than the Island as a whole, but generally similar in socioeconomic profile except for a higher proportion of workers in the resort sector that grew up with the area over the last 10-20 years. The area has fewer professionals but more workers in the "arts, entertainment, recreation, accommodation and food services." Holualoa appears more upscale and newer than Kona. Overall, the census data bears out the impression that Kailua is the hub of North Kona, around which an influx of newer in-migration is gathering.

133. At full build-out, the Staff Housing Community will provide housing for approximately 100 families, in addition to the families who will reside in the planned six single-family homes. Assuming an average household size of 2.5, that equates to potentially 265 occupants. If half of those occupants are new to the Big Island, approximately 133 new residents would be added to the Big Island.

134. Within the Student Villages, assuming an average unit will contain 1.5 staff or 3.9 students, at full build-out, the Student Villages will provide housing for approximately 702 students and 270 staff. Assuming that all of the residents of the Student Villages are new to the Big Island, the Student Villages would result in an increase of approximately 972 residents to the general population.

Housing

135. A decadal increase in housing units generally mirrored the increase in population between 1990 and 2000. As of 2000, there were 13,330 housing units in the North Kona district, up 68% from 1990. Kailua had 4,322 units, up 20% from 1990, Holualoa had 3,330, up 63% from 1990. The distribution of housing stock between owner-occupied and rental housing was profoundly divergent from the island-wide average.

136. At the time of the Commission's hearing on the Original Project in 2003, 65% of the housing units in Hawaii County were owner-occupied, 35% of the housing units were rentals; the rental vacancy rate was 8%. Holualoa had generally similar numbers. However, in Kailua, owner-occupied and rental housing was nearly evenly divided, and according to the 2000 US Census, the rental vacancy rate was a healthy (for renters) 12%. The market conditions at the time of the Commission's hearing on the Revised Project indicated increased pressure for higher market prices, thus generating upward pressure on rental rates.

137. The addition of up to 400 new housing units will raise the number of housing units in North Kona by approximately 2.5%-3%, and will increase the total number in Kailua and Holualoa by approximately 5%.

138. Operation of the Recreation Facilities is expected to offer a variety of jobs. It is expected that volunteers and students from the U of N will fill some of those positions, with the remainder of the positions being filled by members of the local community.

139. The construction of the Revised Project will provide temporary employment for current area residents. In assessing the Original Project, the Commission found that construction workers attracted to Kailua-Kona for temporary construction jobs related to the Original Project would be able to find housing for the duration of their employment or longer. Construction workers for the Revised Project should be similarly situated.

140. Condition J under Ordinance No. 02-101, requires Petitioner to comply with the applicable affordable housing requirements pursuant to Chapter 11, Hawaii County Code, which may include but not be limited to the following options:

- provision of in-lieu fees;
- provision of off-site housing units;
- provision of developable lands;
- provision of infrastructure/services; and
- other means approved by the County.

Petitioner has committed to the Commission that it will comply with affordable housing requirements of the County of Hawaii.

Economy

141. Portions of the Revised Project may provide short-term employment in the areas of development, construction, financing, architecture, engineering, insurance, accounting, law, and other related employment relative to the development, and in the operation of the Sports and Recreation Facilities. Full and part-time job opportunities may be created in the areas of: administration and staff support, accounting, finance, customer service, security, property management, personnel, production and promotion, clerical, landscape maintenance, janitorial services, and marketing and advertising.

IMPACTS UPON THE RESOURCES OF THE AREA

Flora and Fauna

142. A flora and fauna study and biological survey of the Petition Area was completed in July 2002. The purpose of the survey was to identify any State or federally listed threatened or endangered plant species growing on or near the Petition Area, and to summarize the populations of native and introduced plant species. All portions of the Petition Area were surveyed, and all of the naturalized and most of the prominent landscaped plants were noted. During the course of the plant survey, all bird species present on the project site were identified by sight or sound. No mammals were sighted, although it is likely that a number of aliens including mongooses, rats and cats inhabit the Property.

143. The general landscape of the Kailua-Kona area has been radically changed by centuries of settlements, over a century of grazing and particularly by the development of hotels, condominiums, resort homes and associated infrastructure and commercial activity since 1960. The vegetation has also been fundamentally altered by alien species invasion to the point that in many locations native species are few to none. The alien species invasion of kiawe (*Prosopis pallida*) and koa haole (*Leucaena leucocephala*), long ago became dominant in the

coastal dry forest. As is typical of the region, the Property has been managed for grazing and thus the vegetation is non-natural and almost completely alien. The Petition Area is basically kiawe parkland with an understory of guinea grass (*Panicum maximum*). Other trees, including opiuma (*Pithecellobium dulce*) are present infrequently in the canopy. The understory contains a number of other species, and is in some areas dominated by *Desmanthus virgatus*. Variations in grazing and lava type appeared to have left some areas (particularly the mauka and southern ends) denser with vegetation than others.

144. No threatened or endangered plant or animal species are present or would be expected to be present on the Property. In terms of conservation value, no botanical or zoological resources requiring special protection are present.

Surface Water, Flooding and Drainage

145. There are no known drainage ways on the Property. The nearest major drainage way is the Waiaha drainage way located about 600 feet from the edge of the Property on the opposite side of the Hillcrest subdivision. The low rainfall, site drainage plan and any drainage mitigation measures to be implemented pursuant to requirements of the County Department of Public Works ("DPW") will minimize the impacts associated with storm water runoff. The Federal Emergency Management Agency's Flood Rate Insurance Maps indicate that the Property is within Zone X, which represents areas determined to be outside the 500-year floodplain.

146. In connection with the Original Project, a Drainage Report for Hualalai Village was prepared to analyze off-site drainage flows that are tributary to the Property and to propose mitigation for the impacts of these flows. The study quantified flows through three culverts below the Queen Kaahumanu Highway that could potentially impact the Property. Of

the three culverts, only one culvert, an 84" culvert near the southeast corner of the Petition Area, actually impacts the Petition Area. Flow from this culvert will be directed to a retention basin with drywells designed to infiltrate the 100-year storm flow. Discharge from the other two culverts will not impact the Property. There are catch basins along the Hualalai Road/Queen Kaahumanu intersection that contribute a small amount of off-site flow. This flow will be disposed of through drywells.

147. The DPW expressed concern regarding possible diversion of flows to off-site properties due to the curb, gutter and sidewalk that is currently being constructed along Hualalai Road as part of Hualalai Village Phase I. Petitioner demonstrated to the DPW's satisfaction that off-site drainage is not being diverted to other than historic drainage patterns through the U of N property at TMK: (3) 7-5-10:03. By letter dated March 4, 2003, the DPW accepted the Drainage Report for Hualalai Village dated September, 2002 as satisfying Condition G of Ordinance No. 02-01.

Historical/Cultural Resources

148. A Cultural Impact Assessment was conducted in December 2002, to assess the potential impacts upon any identifiable cultural properties, features, resources, practices or beliefs of native Hawaiians or any other ethnic groups that are associated with the Property or specific to the Wai'aha ahupua'a.

149. The Property is located within the Kula zone, and thus was probably not heavily settled in comparison to the shoreline and mauka regions. The historic clearing of much of the Property for cattle grazing and ranching further impacted the Property.

150. The Petitioner and its consultants have uncovered substantial evidence, as determined by Petitioner's cultural assessment, of valued cultural, historical or natural resources

within the Property, but have not found that traditional and customary native Hawaiian rights are currently exercised within the Property. As such, it is unlikely that any valued resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action. Additional archaeological survey and mitigation work will be undertaken on the Property.

151. If in the future, any valued cultural, historical, natural resources and/or traditional and customary native Hawaiian rights are discovered in the Property, Petitioner will report this matter to the State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division ("DLNR-SHPD") for review and assessment.

152. As a cultural landscape, the ahupua`a of Wai`aha offers a kaleidoscope of historical and cultural features and properties. Historical documentation indicates that as early as the 15th century, the mokuoloko of Kona was a recognized residential and political center whose population was sustained by a variety of agricultural activities and an abundant coastal resources base. Evidence of these traditional land use patterns are documented in remnant cultural properties and features of na heiau ho'oulu 'ai, na ku'ula, springs, enclosures, and terraces of the once extensive Kona field system.

153. During the late 1800s, the upper slopes of Wai'aha served as a summer residence for Emma Naea Rooke and Alexander Kalanikualiholihokekapu 'Iolani.

154. Wai'aha, meaning "gathering water," has one major tributary system whose headwaters are situated in the upper slopes of Hualalai, near 'Umiahu and Kumukou. However, intermittent flow rates of the system historically influenced the development of dryland agriculture.

155. Sources suggest that by the late 1890s, much of the land within the Wai'aha ahupua'a was utilized by the Kona Sugar Company to support the sugarcane industry. Following the closure of the plantation in 1926, Manuel Gomes as part of an immense cattle and ranching operation purchased much of the land within Wai'aha, including a large portion of the Petition Area.

Archaeological Resources

156. Permanent settlement began in the Kailua-Kona area in approximately A.D. 1000-1200. Several large and densely populated centers were situated at several locations along the shoreline between Kailua and Honaunau, and included dwellings for rulers, chiefs and people, places of refuge, and other structures. Also present are large and small heiau, sporting areas, and burial clusters. Fishing and farming were the major economic activities. The zone of habitation was segmented makai to mauka, a land division known as an ahupuaa, and included: a) the shoreline inland to approximately 600 feet; b) the Kula, which extended approximately to 500 feet in elevation where some food growing occurred and where permanent habitations are more sparsely distributed; and c) several other zones demarcated primarily by elevation. The Property lies within the Kula zone.

157. Two levels of archaeological/historical reconnaissance have been performed for a portion of the Petition Area. Previously, an eastern portion of the Property was inspected and given clearance by the DLNR-SHPD. In April 2002, an initial field assessment survey was done for the remainder of the Petition Area to determine if any features of archaeological, cultural or historic importance were observable and to make a preliminary assessment of possible historic-preservation treatments appropriate or required by such features. The assessment survey identified 28 possible sites comprising approximately 53 features,

including walls, terraces, mounds, modified outcrops, stone concentrations, platforms, enclosures, and a lava blister cave. The functional types included boundary, temporary and permanent habitation, possible grave, possible ceremonial, clearing, ranching, and indeterminate. During this survey, as many as 30-35 component structural features at eleven different sites were tentatively identified as possible burial features. This tentative functional identification was based primarily on physical similarities to structural features previously identified on other survey projects and confirmed through excavation to contain human skeletal remains.

158. Subsequently, a follow-up investigation was conducted in the survey area of the April 2002 assessment to sample a reasonable number of the possible burial features to determine the following: (a) the presence or absence of burials in the sample of features tested; (b) if present, the number of additional burials likely to be represented by the remaining features that were not tested; (c) the historic preservation implications of any such burials for the feasibility of any proposed development; and (d) the general scope of the work and level of effort for any subsequent archaeological-historical preservation work that might be appropriate and/or required. The ultimate objective of any such subsequent work would be to comply with all applicable historic preservation requirements of the Hawaii State Historic Preservation Division (SHPD) and the Hawaii County Planning Department. The April 2002 survey and the follow-up sampling were performed by PHRI, Inc.

159. No human skeletal remains were recovered within or beneath the eleven sampled possible burial features at eleven different sites. Possible explanations of rock mound features include prehistoric, historic, or modern agricultural clearing mounds; areas of prehistoric sweet potato cultivation, or temporary prehistoric habitation platforms. Other significant archaeological features were noted during the initial survey and recommended for follow-up

investigation and appropriate treatment, possibly including preservation in place in some cases. The results of the fieldwork in the April 2002 survey area do not preclude the existence of human skeletal remains elsewhere on the Property.

160. During the follow-up investigation, cultural remains, including a coral abrader (surface) and several pieces of cowrie shell (subsurface) were noted at Site 2235-7. An adze fragment (surface) and several pieces of unidentified shell (subsurface) were noted at Site 2235-4.

161. An Archaeological Inventory Survey was conducted by Rechtman Consulting in February, 2003 for the April 2002 survey area. Twenty-six sites were defined including the previous recorded Kuakini Wall. The sites include Historic Period walls and enclosures, Precontact temporary and permanent habitation sites, Precontact burial sites, trail segments, an agricultural complex containing 297 features, one ceremonial enclosure and platform, and a papamū. There are four breaches in the Kuakini Wall. No lava tube entrances were found.

162. Subsurface testing was conducted at 22 separate features within 10 sites, including habitation, agricultural, and suspected burial features. The presence of human remains was confirmed at three suspected burial sites. DLNR-SHPD Burial Program was notified of the discovery of the human remains.

163. All 26 sites were assessed for their significance based on criteria established and promoted by DLNR-SHPD and draft Section 13-284-6, HAR (1998) with treatment recommendations for the 26 sites. Five sites were recommended for preservation: Site 6302 (ranching/boundary-Great Wall of Kuakini); Site 23681 (ceremonial-agricultural heiau); and Sites 23683, 23684 and 23685 (burials). The Petitioner has also voluntarily committed to

preserve, with interpretative development, the papamū or rough square game board identified as Site 23682.

164. DLNR-SHPD, by letter dated May 7, 2003, concurred with the site significance evaluations as addressed in the Archaeological Inventory Survey, and recommended the five sites for preservation and 10 sites for data recovery.

165. Two mauka-makai trail segments located on the Property were not recommended for preservation by DLNR-SHPD.

Scenic and Visual Resources

166. The Property is located on the lower western slopes of Mount Hualalai, one of five shield volcanoes whose lava flows created the island of Hawaii. The Property is bordered by Kuakini Highway on the west, Hualalai Road and Queen Ka`ahumanu Highway to the east, the U of N- Kona campus to the north and the Kona Hillcrest subdivision on the south. The Property is gently sloping, rising in elevation from approximately 100 feet at Kuakini Highway to 325 feet at its highest point, with the steepest slopes on the upper mauka side just below Hualalai Road. Slopes average 5-10% but increase to as much as 25% just below Hualalai Road. Certain residential units in the Revised Project may have a view of Kailua Bay. The site plan preserves these views.

ENVIRONMENTAL QUALITY

Hazards – Tsunami, Lava Flows and Earthquakes

167. Tsunami: The Federal Emergency Management Agency Flood Insurance Rate Map shows no areas of potential tsunami inundation on the Property.

168. Lava Flows: Hazard zones from lava flows are based chiefly on the location and frequency of both historic and prehistoric eruptions. The hazard zones also take into account the larger topographic area. The island of Hawaii is divided into nine hazard zones

according to the level and degree of potential hazards related to lava flows. An area designated as Zone 1 is considered to be an area of greatest potential hazard. These designated zones are determined primarily from the location and frequency of past eruptions.

169. The Kailua-Kona area is within Zone 4, indicating a moderate hazard. Zone 4 includes all of Hualalai, where the frequency of eruptions is lower than on Kilauea and Mauna Loa. Flows typically cover large areas. The dormant Hualalai last erupted in 1801 (Stearns and McDonald, 1946). Since 1800, five percent of the Hualalai area has been covered by lava. In the last 750 years, 15% has been covered.

170. "Historic eruptions" include those for which there are written records, beginning in the early 1800's, and those that are known from the oral traditions of the Hawaiian people. Our knowledge of prehistoric eruptions is based on geologic mapping and dating of the old flows of each volcano. In the last 3000 years, Hualalai has erupted near its summit, along the northwest and south-southeast rift zones, and from vents on the north flank of the volcano. Twenty-five percent of the volcano is covered by flows less than 1000 years old. Hualalai last erupted in 1800-1801 from several vents on the northwest rift zone. Large flows spilled down both sides of the ridge formed by the rift zone and quickly reached the ocean. One of these flows lies south of Kiholo Bay, and part of the Kona Village resort is built upon it. Another flow underlies the northern end of the Keahole (Kona) Airport. Other major eruptions occurred about 300 and 700 years ago. A large flow from the 700-year old eruption forms the north side of Keauhou Bay, south of Kailua-Kona.

171. Earthquakes: The entire island of Hawaii is susceptible to earthquakes originating in fault zones under and adjacent to the island. Two fault zones have been identified within the Kona region: the Kealakekua and the Kaloko faults, both located in South Kona and

well away from the Property. According to previously established procedures, the United States Geological Survey conducted a probabilistic seismic-hazards assessment in 1997. From this assessment, seismic zones were re-assigned for each county. The classification system is based on a scale of 0 to 4, increasing in level of risk due to seismic occurrence and danger. Due to the island's active volcanic activity, the entire county of Hawaii lies in a seismic zone designated as Zone 4, the highest designation.

172. Under the Uniform Building Code seismic provisions, a Zone 4 area could experience severe seismic activity between .30 and .40 of the earth's gravitational acceleration (g-forces) causing major damage to poorly designed or built structures. The potential of damage caused by strong earthquakes is a prevalent concern for the entire County of Hawaii. As such, the Revised Project will be in compliance with the Uniform Building Code and County of Hawaii structural design standards, including earthquake design provisions.

Coastal Waters

173. As described above, rainfall in the area is generally quite low and evenly distributed throughout the year. Site design will minimize runoff and provide for its collection, including runoff from newly hard-topped areas, and for its dispersal through percolation from drywells. Adequate provision has been made for the 100-year flood event. No surface water is expected to reach the coast directly, or flow into drainage ways north or south of the Property and so reach the coast. The management of surface water and drainage control measures during construction and subsequent operation will meet County of Hawaii and State Department of Health standards. The Property's location approximately one-quarter mile inland from the coast is sufficient to further reduce the possibility of any such impacts, and no impacts on coastal waters are anticipated.

Air Quality and Noise

174. The Revised Project is expected to create short-term disturbances to the present air quality and noise levels for the area due to construction. The Petitioner will implement standard dust and noise attenuation measures during the construction period to minimize the negative short-term effects on these conditions.

175. Potential subsequent impacts to local air quality are expected to be minimal, and limited to emissions from any increase in the number of motor vehicles operated by residents of the Staff Housing Community and Student Villages. By providing a landscape design that reduces or eliminates the need for motor vehicles and encourages walking, noise and air quality impacts from the Revised Project will be minimized.

Water Quality

176. There are currently 297 water units available for the portion of the Hualalai Village within the Petition Area. The Department of Water Supply (DWS) is in the process of developing a well at Waiaha and up to 1,000 units of water from that source will become available within the next 12 to 18 months. Off-site infrastructure improvements are required to transmit the water from the well to the Petition Area. Discussions with DWS regarding the development of the necessary transmission lines and tanks are ongoing. Once an agreement is reached regarding the off-site infrastructure improvements, water commitments can be secured for the Revised Project.

177. The only intrusion into the groundwater table is expected to be the possible drilling of a well to supply brackish water for the central water feature. This is not expected to have a significant impact because the water will be recirculating and evaporation losses are not expected to be significant. The low rainfall, site drainage plan and any drainage

mitigation measures to be implemented pursuant to requirements of the DPW and the State Department of Health will minimize the potential for adverse water quality impacts.

178. Two 500,000 gallon water tanks are located on the Property and will be replaced by a 1.0 million gallon tank located further south on the Property.

Recreational Resources

179. The Kona coast has relatively few education and recreation facilities. The Expanded Academic and Recreation Facilities will provide the community a new destination for theater performances. The performance theater complex will provide for a diversity of cultural, artistic, and recreational needs for present and future generations. The facility will be open to the community for special events.

180. Appropriate provisions for recreation have been made for the Revised Project. The landscape design of the housing areas is such that it encourages walking and biking instead of driving.

ADEQUACY OF PUBLIC SERVICES AND FACILITIES

Transportation/Roads/Traffic

181. Based upon the findings of the final report on the Keahole to Honaunau regional circulation plan, the County of Hawaii has developed an action plan to prioritize local transportation projects.

182. To address traffic congestion in the Kona Region, the County of Hawaii and/or the State of Hawaii have committed to roadway improvement projects which have been funded through the construction phase. These include the widening of Queen Kaahumanu from Kealakehe to Henry Street, traffic safety improvements without widening at Palani Road, Kuakini Highway widening, pedestrian improvement project along Alii Drive, and the southern phase of the Kahului-Keauhou Parkway from Kamehameha III Road up to Lako Street.

183. Additional planned and ongoing projects include roadway improvements to the Queen Kaahumanu Highway from Henry Street to Kamehameha III Road; the northern phase of Kahului-Keauhou Parkway; completion of mauka/makai roads along Lako Street and Laaloa Avenue; and alternatives to the intersection of Palani and Queen Kaahumanu, such as the Kealakehe Parkway connection to the Henry Street extension. Funding for these projects ranges from secured to uncommitted.

184. Projects with committed funding in the vicinity of the Property include the widening of Kuakini Highway and pedestrian improvements along Alii Drive. The construction for the widening of Kuakini Highway from Palani Road to Hualalai Road is underway.

185. The County acknowledged that the utilization of fair share contributions collected from fair share assessments imposed pursuant to Hawaii County Code Section 12-162 needs improvement to insure that the funds are utilized for specific projects through the CIP process and to insure that the fair share payments do not languish in the accounts. The County committed to develop and improve systems to track the fair share assessments, to verify payments made and disposition of the payments, to develop an accounting system that is linked to the Planning Department's permit-tracking system and CIP data base system to assure that the fair share assessments are spent for appropriate projects in the vicinity of the contributing project, and to optimize the use of matching funds to leverage federal or State grants.

186. To alleviate the increased traffic congestion in the region, the County is implementing alternatives such as Transportation Systems Management and Transportation Demand Management, which contemplate coordination of traffic signals, HOV and adjustments to peak hour travel by addressing hours of work. The County is also concentrating on implementing increased mass transit, bikeway and pedestrian travel to minimize traffic.

187. Access to the Revised Project would be via a single roadway connecting to Kuakini Highway about 3,600 feet south of the Kuakini/Hualalai Rd. intersection. There would be a controlled access point between the existing Hualalai Village and the expanded campus so that Hualalai Village residents could reach Kuakini Highway. The controlled access would be opened in times of emergency so that the general public could use this route as a secondary route.

188. Based upon a Traffic Impact Analysis Report for the Original Project by M&E Pacific ("TIAR") that analyzed ambient and projected levels of traffic at: (a) Hualalai/Kuakini; (b) Kuakini/Oni Oni; (c) Hualalai/Queen Ka`ahumanu; and (d) Queen Ka`ahumanu/Nani Kailua, ambient traffic can be expected to increase due to regional growth and new projects in the area during the period between 2002 through 2007. The housing proposed for the Original Project was expected to generate peak traffic of 150 trips during the morning and 190 trips in the afternoon commuter hours.

189. The Addendum to the TIAR dated February 17, 2003, reanalyzed the traffic forecasts and traffic impacts for the Original Project to include the cumulative traffic impacts of several proposed developments in the vicinity. The reanalysis indicated that traffic generated by other proposed developments (Kona Hawaiian Village, Kona Sea Ridge, Alii Cove) could have significant adverse impact at the Kuakini Highway/Walua Road intersection. The opening of the proposed Kahului to Keauhou Parkway is expected to decrease through traffic problems on Kuakini Highway and decrease delay times/improve level of service on Walua Road.

190. The State Department of Transportation ("DOT") reviewed the TIAR and raised concerns regarding the interaction of the entire master planned development at build-out,

compliance with standard practices in preparation of a TIAR, supporting documentation and justification, and mitigation of project generated traffic impacts.

191. According to the 2006 TIAR, given the proposed on-campus staff and student housing, estimated traffic flows from the Revised Project are not expected to have a significant adverse traffic impact on the neighboring road system. Petitioner will submit the 2006 TIAR for review and approval by the DPW as part of Petitioner's rezoning of the Property.

Water Service

192. The Revised Project will be served by the County Department of Water Supply system. The County Department of Water Supply has indicated that 297 water units will be allocated for the Staff Housing Community and Student Villages within the Petition Area. Discussions between Petitioner and the County regarding any water unit balance needed for the Expanded Academic and Recreation Facilities are currently underway.

193. The water infrastructure for the Revised Project will be constructed incrementally in conjunction with the development of the various components of the Revised Project. However, the overall system is planned in an integrated fashion with storage capacity to be maintained in the planned tanks in the Villages and at an off-site location adjacent to Hualalai Road.

Wastewater

194. Wastewater for the Revised Project will be collected via an on-site gravity system. The on-site system will discharge to a trunk sewer line that has been constructed in Kuakini Highway. The flow is tributary to the County's municipal wastewater treatment plant at Kealakehe.

Solid Waste/Sanitation

195. Solid waste for the Revised Project will be handled by private solid waste hauling contractors. Waste reduction will be incorporated into the design of the Revised Project. A solid waste management plan will be prepared as required by the County.

Drainage

196. There are no known drainage ways on the Property. The nearest major drainage way is the Waiaha drainage way located about 600 feet from the edge of the Property on the opposite side of the Kona Hillcrest Subdivision. The low rainfall, site drainage plan and any drainage mitigation measures to be implemented pursuant to requirements of the County Department of Public Works will minimize the problems associated with storm water runoff. The FIRM map indicates the Property is not in a flood prone zone.

197. The drainage area directly mauka of the Property (above Queen Ka`ahumanu Highway) is divided into four (4) smaller drainage basins. Impacts from off-site runoff for the Staff Housing Community, Student Villages, and Expanded Academic and Recreation Facilities will be mitigated through the construction of retention basins with drywells. The retention basins will be designed with the potential to increase capacity should it be warranted in the future. In addition, emergency overflow from the retention basins will be directed toward the street and driveway drainage systems. All anticipated off-site flows will be handled by existing drains along Queen Ka`ahumanu Highway and proposed new drywells. Increase in runoff from impervious surfaces within the Property will be disposed of through drywells. By letter dated March 4, 2003, the Department of Public Works, accepted the Drainage Report for Hualalai Village dated September, 2002 as satisfying Condition G of Ordinance No. 02-01.

Power and Telephone

198. Utility poles along both Hualalai Road and Kuakini Highway provide electrical power. By letter dated January 31, 2003, Hawaii Electric Light Company (HELCO) indicated to the Public Utilities Commission that HELCO will have sufficient capacity available on its system to serve the Revised Project into the foreseeable future and to cover the projected annual system peaks.

199. Telephone service is also available to the Revised Project along the same pole lines. Telephone service is provided by Hawaiian Telcom.

Police and Fire Protection

200. The County of Hawaii provides police and fire protection for the entire island. The Petition Area is well served due to its proximity to existing urban areas and location along major roadways. The nearest fire station is located near the corner of Palani Road and Queen Ka`ahumanu Highway about a mile away. Additionally, all buildings will be built to meet life safety and fire code requirements.

Schools

201. The current U of N campus is immediately adjacent to the Petition Area. The Expanded Academic Facilities will be a part of this campus. Several private and public schools serve the Kailua-Kona area. They include Hualalai Academy, Kahakai Elementary, Kealakehe Elementary, Kealakehe Intermediate, Kealakehe High School, Kona Montessori School, Hualalai Academy, Kona Christian Academy, and Makua Lani Christian High School. The nearest public high school is Kealakehe High School several miles to the north. The West Hawaii Branch of the University of Hawaii Center at West Hawaii, a branch of the Community College System, is located to the south in Kealakekua.

Parks

202. There are few parks in the Kona region. The nearest large park is the State of Hawaii's Old Kona Airport Park just north of Kailua Kona past the industrial park. A smaller County beach park, Hale Halawai is closer to the Property near the terminus of Hualalai Road. Immediately adjacent to the Property is a small community park in the Hillcrest subdivision.

203. The U of N has recreational amenities scattered through its campus including children's play areas and a soccer field. New recreational amenities are planned, in coordination with landscaped buffers and green space throughout the Revised Project.

Health Facilities

204. The nearest hospital is Kona Community Hospital which is located to the south in Kealakekua about 10 miles away. Several private clinics are located in Kailua Kona near the Property.

COMMITMENT OF STATE FUNDS AND RESOURCES

205. The on-site development of the Revised Project will be funded through a combination of niche financing and conventional financing, and donors from the friends, faculty and staff of the U of N affiliates, and will not require direct expenditures by either the State of Hawaii or the County of Hawaii.

206. State of Hawaii and/or County of Hawaii funds are being committed to local and regional traffic improvements in the area of the Revised Project.

CONFORMANCE TO APPLICABLE DISTRICT STANDARDS

207. The proposed reclassification is in general conformance to Section 15-15-18(1) to (8) of the Land Use Commission rules, standards for determining "U" Urban District boundaries.

CONFORMANCE WITH GOALS, OBJECTIVES AND POLICIES OF HAWAII STATE PLAN

208. Pursuant to Section 205-17(1), HRS and Section 15-15-77(b)(1), HAR, and subject to the conditions of approval set forth herein, the reclassification of the Property conforms to the applicable goals, objectives and policies of the Hawaii State Plan, Chapter 226, HRS, as amended with respect to the following State Plan objectives and policies, based upon the following:

Section 226-5: Objective and Policies for Population: The staff and student housing represents a minimal increase of approximately 2½-3% in the population of North Kona and an increase of approximately 3% in the population of Kailua-Kona and Holualoa combined.

Section 226-6: Objectives and Policies for the Economy – In General: the Revised Project will create temporary jobs in construction and ongoing jobs in operation of the facilities.

Section 226-7: Objectives and Policies for the Economy – Agriculture: Under the Original Project the Property was reclassified from Agricultural to Urban State Land Use District. While the Property has a history of use for cattle grazing, the land was poorly suited for agricultural production. The County of Hawaii had 1,214,732 acres of land in the Agricultural land use designation in 2000; North Kona had 158,853. The reclassification of 62 acres to the Urban Land Use District was a relatively insignificant change, especially in this case, where the land was poorly suited to agriculture.

Section 226-12: Objectives and Policies for the Physical Environment – Scenic, Natural Beauty, and Historic Resources: The planning and design of the Revised Project reflects the history, location, topography and setting of the Property. Prominent view corridors and major topographical features will be maintained in the design of the Revised Project. The historical setting of the region will be reflected in its traditionally based planning, architecture, site amenities and operation. The DLNR-SHPD will be consulted regarding treatment of any historic sites that are identified within the Property. No rare or endangered plant and animal species or habitats are present on-site. Native habitats do not exist on the Property given its history as an agricultural parcel and the introduction of non-native species over time.

Section 226-13: Objectives and Policies for the Physical Environment – Land, Air, and Water Quality: Developing the Revised Project is consistent with the intent of this objective as the Petition Area is adjacent to existing urban community and commercial developments. The Revised Project is intended to cluster development and compatible activities and facilities in this area.

Section 226-14: Objectives and Policies for Facility Systems/In General: Existing roadway systems are generally adequate to accommodate the Revised Project. The water system will tie into the County's water system. At the present time capacity for the initial phases of the Revised Project seems sufficient to meet the projected demand. Additional capacity will be developed as required by the Department of Water Supply as the development of the Revised Project will be phased in with development of new water sources by the County. The wastewater system will connect to the existing County system. System capacity is adequate to accommodate the projected loads from the staff and student housing and academic and recreation facilities. Drainage designs will meet County standards for runoff. No offsite impacts are expected.

Section 226-19: Objectives and Policies for Socio-Cultural Advancement - Housing: Approximately 882 people will be housed with the addition of three Student Villages. Up to 100 units will be made available for purchase by staff. The addition of up to 400 units of multi-family housing (comprised of units in the Staff Housing Community and the Student Villages) is proposed as a major component of this development. The units will be situated adjacent to the University facilities, within the unique Kona setting and at a pedestrian scale. The Staff Housing Community and Student Villages will be closely linked to the University and provide will much needed additional housing opportunities for U of N staff and students. The University hosts international students from 30 – 50 nations at any one time. This institution makes a significant contribution to cultural diversity as well as training in cross-cultural relationships.

Section 226-23: Objectives and Policies for Socio-Cultural Advancement – Leisure: The proposed new academic and recreational facilities will be available for use by members of the Kailua Kona community for special events. The College of Arts and Communications will provide a place to enjoy theater performances. The Multi-Purpose Gymnasium will provide balcony seating for viewing sports activities, thereby providing new recreational opportunities.

CONFORMANCE WITH APPLICABLE PRIORITY GUIDELINES AND FUNCTIONAL PLANS

209. State Education and Higher Education Plan: The U of N is a mission-based educational institution, founded in Kona in 1977. This non-traditional, globally networked university offers viable university-level learning opportunities for emerging leaders in Kona and other locations worldwide. The Revised Project is intended to support the U of N's mission.

210. State Transportation Plan: Roadway improvements will conform to projections for growth in this region. Transportation standards will be observed during development.

211. State Recreation Plan: The Revised Project includes recreation facilities with a Multi-Purpose Gymnasium, track, fields for soccer, football and softball, tennis courts, volleyball courts, a walking/running "vita course" with exercise stations around the campus, and an Olympic pool. The landscape design of the Revised Project encourages walking and biking.

212. State Water Resources Development Plan: The State Water Resources Development Plan is a plan with a broad mandate and agenda to "guide the development, conservation, and administration of Hawaii's water and related land resources on a comprehensive and coordinated basis." As such, new development must be located logically and the short term and long term impacts should promote resource availability and water quality. The Revised Project is located in an urban infill area between two existing urban developments, the Hillcrest subdivision and the U of N campus. By its location, it consolidates and minimizes the expansion of water infrastructure for urban development. In addition to suitable native species, the landscaping will consider xeriscape concepts and species to reduce water demand. The drainage plans for the Revised Project will include drywells that will enhance percolation into the ground and help recharge the aquifer and that will have capacity for expansion. The overall concept calls for management of rainwater on site through filtration within the landscaping or dry wells.

213. State Agriculture Plan: The Revised Project is within the State Land use Urban District.

214. State Tourism Plan: The Revised Project will provide alternate education and recreation facilities consistent with the goals and policies of the State Tourism Plan.

215. State Housing Plan: The Revised Project will accommodate the housing needs of most of the students and staff of the U of N. This will reduce the overall housing demand within the area. The Revised Project will not create additional demands on the limited housing market because the students and staff living on-site will not be competing with local residents for housing. The Petitioner has agreed to comply with the applicable affordable housing requirements of the State and County in the development of the Revised Project.

216. State Employment Plan: The Revised Project is intended to reflect the needs and desires of the Kona and U of N communities through the creation of new housing and additional educational and recreational facilities. The Revised Project will provide some employment opportunities for area residents. The academic and recreational facilities, along with the residential component of the Revised Project, are anticipated to generate up to 30 temporary and permanent part-time and full-time jobs.

CONFORMANCE WITH OBJECTIVES AND POLICIES OF THE HAWAII GENERAL PLAN

217. The Staff Housing Community, Student Villages, and Educational and Recreation Facilities are consistent with the Medium Density Urban designation of the Hawaii County Land Use Pattern Allocation Guide Map. The Revised Project will build approximately 11 residential units per acre. The Educational and Recreation Facilities are also consistent because the County's Multiple-Family Residential (RM), Village Commercial (CV) and Residential – Commercial Mixed Use (RCX) districts allow these uses. In the words of the General Plan, "[t]he land use pattern is a broad, flexible design intended to guide the direction and quality of future developments in a coordinated and rational manner."

Economic: University of the Nations-Kona hosts international students from 30 - 50 nations. The University makes a significant contribution to cultural diversity as well as training in cross-cultural relationships. The Revised Project provides additional housing for staff and expanded activities with enrichment programs for residents and visitors. Staff and students associated with the University also make substantial contributions to the West Hawaii economy. This Revised Project will enhance further growth of the University and add opportunities for residents to improve their quality of life through further educational opportunities.

Environmental Quality: Drainage will be disposed of through the use of drywells. Wastewater will be tributary to the County of Hawaii's sewer system and wastewater treatment plant. Throughout construction and operation, the Revised Project will remain in compliance with all applicable Federal, State and County air, water solid waste and noise control standards.

Flood Control and Drainage: the Flood Insurance Rate Map (FIRM) for this vicinity shows the Waiaha Drainage way located approximately 1,000 to 1,500 feet south of and separated from the Petition Area by the Hillcrest Subdivision. Consequently, no known drainage ways are located on the Property. Off-site runoff that enters the Property will be disposed of through retention basins and drywells. This will mitigate any existing drainage problems that occur downstream of the Revised Project as well as protect the Property from storm damage. Increased runoff generated by the Property will be disposed of in drywells. Best Management Practices will be used to prevent soil erosion.

Historic Sites: An archaeological assessment survey was conducted by Paul H. Rosendahl, Ph.D., Inc. in April 2002, and an Archaeological Inventory Survey was conducted by Rechtman Consulting in February, 2003 for the portion of the Petition Area not reviewed and cleared by DLNR-SHPD. In its letter dated May 7, 2003, DLNR-SHPD concurred with the site significance evaluations as addressed in the Archaeological Inventory Survey, and recommended five sites for preservation and 10 sites for data recovery. Between October 29 and December 20, 2002, Rechtman Consulting, LLC conducted an intensive field survey of the entire Property. The presence of burial human remains was confirmed at three platform features. DLNR SHPD Burials Program has been notified of the discovery of human remains. The three sites were recommended for preservation. In cooperation with the State Historic Preservation Officer, a treatment and mitigation plan will be developed for all features determined to be archaeologically or historically significant.

Natural Beauty: The philosophy of the entire Revised Project is to "build to the land," avoiding major cuts and fills, design to facilitate pedestrian access, and build to a lower residential density than the site would allow to provide a better quality of life for residents over the long term. The landscaping and design through the Revised Project will encourage residents to leave their cars at home and walk to and from Kailua Village.

Housing: The Revised Project will provide additional residential inventory for West Hawaii and will consist of units targeted for individuals affiliated with the University, thereby reducing the demand for other local housing. The Revised Project is located within close proximity to all necessary urban services and facilities, and will help complete the urban core for that area of Kailua-Kona. The Revised Project will be completed in compliance with required codes and standards.

Public Facilities: The Revised Project includes recreational amenities for residents and guests. The establishment of a Multi-Purpose Gymnasium and performances arts theater shall be available to the community for special events.

Public Utilities: The Revised Project is located adjacent to Kuakini Highway, Hualalai Road and the University. Water, telephone, electricity, sewer, services are available as described in the following sections.

Water: Engineering consultants working for the U of N are currently in communication with the Department of Water Supply, Engineering Division, regarding the water master plan for TMK: 7-5-10:85 and 7-5-17:6. This planning will also incorporate water storage considerations for the existing U of N Campus, TMK: 7-5-10:3. Alternative transmission line layouts and storage tank locations are being evaluated.

Telephone: Existing telephone lines and poles are available along the property lines of the Revised Project.

Electricity: Electrical utility poles and lines exist along the boundary of the Property. HELCO has indicated that source capacity of the grid is sufficient to accommodate the proposed project. The policy of the U of N is for all on-site utilities to be underground.

Sewer: Wastewater will be serviced through a private sewer line, connecting to an existing sewer line through the University and then connecting to the County sewer at Kuakini Highway. The County of Hawaii has constructed the Kuakini Interceptor Sewer from the University to the Kailua-Kona sewage treatment plant. An extension of the interceptor sewer has been constructed fronting the Property along Kuakini Highway. The Revised Project will connect to this system at the northwest corner of the Property at Kuakini Highway.

Recreation: The plan for the Revised Project includes recreational amenities available for U of N staff and students. In addition, the expanded Educational and Recreation Facilities are intended to be available to the Kailua-Kona community for special events.

Transportation: The existing roadway system, as improved by projected State and County programs, has sufficient capacity to accommodate the growth in ambient traffic and the traffic that will be generated by the Revised Project.

Land Use – Multiple-Family Residential: The Staff Housing Community and the Student Villages will provide new housing units on medium-density parcels in close proximity to similarly zoned urban areas. The Revised Project access points are on collector and arterial roads. Traffic from the Revised Project will not be routed through areas of lesser density to reach regional transportation facilities.

CUSTOMARY AND TRADITIONAL NATIVE HAWAIIAN RIGHTS

218. The Property is located within the Kula zone, and thus was probably not heavily settled in comparison to the shoreline and mauka regions. The historic clearing of much of the Property for cattle grazing and ranching further impacted the Property. The Petitioner and its consultants have uncovered substantial evidence of significant cultural, historical or natural resources within the Property, but have not found any traditional and customary native Hawaiian rights being exercised within the Property. As such, it is unlikely that any valued resources, including traditional and customary native Hawaiian rights, will be affected or impaired by the proposed action. Additional archaeological survey and mitigation work will be undertaken on the Property. If in the future, any valued cultural, historical, natural resources and/or traditional and customary native Hawaiian rights are discovered in the Property, the Petitioner will report this matter to the DLNR-SHPD for review and assessment.

INCREMENTAL DISTRICTING

219. Pursuant to Section 15-15-78 of the Land Use Commission Rules, incremental districting is not required because full development of the Revised Project can be completed within ten years after the date of the Commission's granting of Petitioner's Motion to Amend, and the Commission's Approval of this First Amended Findings of Fact, Conclusions of Law, and Decision and Order for State Land Use District Boundary Amendment in Docket No. A02-737.

RULING ON PROPOSED FINDINGS OF FACT

220. Any of the proposed findings of fact submitted by the Petitioner, and the other parties not already ruled upon by the Commission by adoption herein, or rejected by clearly contrary findings herein, are hereby denied and rejected.

221. Any conclusion of law herein improperly designated as a finding of fact shall be deemed or construed as a conclusion of law, any finding of fact herein improperly designated as a conclusion of law shall be deemed or construed as a finding of fact.

CONCLUSIONS OF LAW

222. The Commission finds upon the clear preponderance of the evidence that the reclassification of the Property, consisting of approximately 62 acres situate at Waiaha 1st, Kailua-Kona, District of North Kona, Island and State of Hawaii, identified as Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06, from the Agricultural District to the Urban District, upon the conditions set forth in this Decision and Order, is reasonable and consistent with the Hawaii State Plan as set forth in Chapter 226, HRS, the policies and criteria established pursuant to Section 205-17, HRS, and conforms to Chapter 15-15, HAR.

223. Article XII, Section 7 of the Hawaii Constitution requires the Commission to protect native Hawaiian traditional and customary rights. The Commission affirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and/or religious purposes on the Property, subject to the right of the State to regulate such rights.

224. The State's power to regulate the exercise of customary and traditional native Hawaiian rights allows the Commission to permit development that interferes with such rights if the preservation and protection of such rights would result in actual harm to the recognized interests of others. Nevertheless, the State is obligated to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians to the extent

feasible. *Public Access Shoreline Hawaii v. Hawaii County Planning Commission*, 79 Hawai`i 425, 450, n. 43, 903 P.2d 1246 (1995).

DECISION AND ORDER

IT IS HEREBY ORDERED that the Property being the subject of Docket No. A02-737, filed by Petitioner U of N Bencorp (now AEKO) consisting of approximately 62 acres of land in the State Land Use Agricultural District at Hualalai, North Kona, Island, County and State of Hawaii, identified as Tax Map Key:(3) 7-5-10:85 and (3) 7-5-17:06, and approximately shown on Exhibit "B", attached hereto and incorporated herein by reference ("Reclassified Area") is hereby reclassified from the State Land Use Agricultural District to the State Land Use Urban District, and the State Land Use District boundaries are amended accordingly.

Based upon the findings of fact and conclusions of law stated herein, it is hereby determined that the valued cultural, historical or natural resources and any customary and traditional native Hawaiian rights and practices within the Reclassified Area that have been identified herein shall be protected in perpetuity; that the reclassification shall not significantly affect or impair the continued exercise of those right and practices; and that the reasonable exercise of those rights and practices shall be protected, to the extent feasible, by the conditions of approval set forth herein.

IT IS HEREBY FURTHER ORDERED that the reclassification of the Reclassified Area from the State Land Use Agricultural District to the State Land Use Urban District shall be subject to the following conditions:

225. Affordable Housing. Petitioner shall provide affordable housing opportunities for residents of the State of Hawaii in accordance with applicable housing requirements for the Revised Project of the County of Hawaii. The location and distribution of

the affordable housing or other provisions for affordable housing shall be under such terms as may be mutually agreeable between the Petitioner and the County of Hawaii.

226. Drainage Improvements. Petitioner shall design and construct on-site and regional drainage improvements required as a result of the development of the Reclassified Area to the satisfaction of the State Department of Health, the Commission on Water Resource Management of the State Department of Land and Natural Resources, and the County of Hawaii. The Petitioner shall prepare a Drainage Study meeting with the approval of the County of Hawaii Department of Public Works. The Drainage Study shall consider regional drainage issues.

227. Public School Facilities. Petitioner shall contribute to the development, funding, and/or construction of school facilities for the Revised Project, on a fair-share basis, as determined by and to the satisfaction of the Department of Education. Terms of the contribution shall be agreed upon in writing by the Petitioner and the Department of Education prior to seeking building permits for any portion of the Reclassified Area.

228. Water Resources. Petitioner shall provide adequate water supply facilities and improvements or equivalent funding to accommodate the Revised Project. The water supply facilities, improvements and/or equivalent funding shall be coordinated and approved by the Commission on Water Resource Management of the State Department of Land and Natural Resources, and the County of Hawaii Department of Water Supply.

229. Wastewater Facilities. Petitioner shall provide adequate wastewater treatment, transmission, and disposal facilities for the Revised Project as determined by the State Department of Health and the County of Hawaii Department of Environmental Management.

230. Archaeology.

a. Petitioner shall submit a complete inventory survey report of the Reclassified Area for the review and approval of the State Historic Preservation Division of the Department of Land and Natural Resources ("DLNR-SHPD"). Petitioner shall prepare and implement a data recovery plan, a preservation plan, a burial treatment plan, and a monitoring plan to be reviewed and approved by the DLNR-SHPD. The submittal of these plans shall be accompanied by the design plans for the Project to facilitate the development of appropriate mitigation measures.

b. Should any previously unidentified human burials, archaeological or historic sites such as artifacts, marine shell concentrations, charcoal deposits, stone platforms, pavings or walls be found, Petitioner shall stop work in the immediate vicinity and the DLNR-SHPD shall be notified immediately. The significance of these finds shall then be determined and approved by the DLNR-SHPD. Subsequent work shall proceed upon an archaeological clearance from the DLNR-SHPD when it finds that mitigative measures have been implemented to its satisfaction. Petitioner shall also comply with all applicable statutory provisions and administrative rules regarding inadvertent burial finds within the Reclassified Area.

c. The proposed mitigation commitments for all identified sites with burials shall be submitted to the DLNR-SHPD for review and comment. A burial treatment plan for those sites, to include without limitation Sites 23683, 23684 and 23685, shall then be approved by DLNR-SHPD, and a certified copy of said plan shall be filed with the Commission prior to any land alteration in the vicinity of these sites.

d. For all sites approved by the DLNR-SHPD to undergo archaeological data recovery, an archaeological data recovery plan (scope of work) shall be

prepared by Petitioner. This plan shall be approved by the DLNR-SHPD and a certified copy of said plan shall be filed with the Commission prior to any land alteration in the vicinity of these sites.

e. For all sites approved for preservation by the DLNR-SHPD, to include without limitation the Great Wall of Kuakini (Site 6302), the papamū or rough square game board (Site 23682), the agricultural heiau (Site 23681), and after completion of the finished grade for the area, at least one of the alignments for the ancient trails (Site 23679 or Site 23680), a preservation plan shall be prepared by Petitioner. (Burial sites are covered under the burial treatment plan.) This plan shall include buffer zones/interim protection measures during construction, and long-range preservation (including public access and interpretation, where appropriate). The plan shall be approved by the DLNR-SHPD and a certified copy of said plan shall be filed with the Commission prior to any land alteration in the vicinity of these sites.

f. Petitioner shall preserve the approximate alignment of at least one of the mauka-makai trail segments. Due to the difficulty of development on this site, the site grading would occur first, then the Petitioner shall reestablish a minimum of one of the two trail segments, Site 23679 (20 meter segment) or Site 23680 (ten meter segment), at a mutually agreeable site, giving allowances for building footprints, on finished grade, in consultation with the Office of Hawaiian Affairs.

231. Cultural, Historical, Customary and Traditional Rights and Resources. Petitioner shall preserve and protect rights to gathering for cultural purposes, including religious practice, by providing appropriate access to burial sites and other archaeological sites within the Reclassified Area consistent with this First Amended Findings of Fact, Conclusions of Law, and

Decision and Order. Petitioner shall adhere to prevailing and/or published protocols of the DLNR-SHPD where these sites are found to exist.

232. Soil Erosion and Dust Control. Petitioner shall implement efficient soil erosion and dust control measures during and after the development process to the satisfaction of the State Department of Health.

233. Transportation. Petitioner shall participate in the pro-rata funding and construction of local and regional transportation improvements and programs necessitated by the proposed development in designs and schedules accepted and determined by the State Department of Transportation (DOT) and County of Hawaii Department of Public Works (DPW). Agreement between the Petitioner and the DOT and DPW as to the level of funding and participation shall be obtained prior to the Petitioner obtaining County zoning, or prior to the Petitioner securing County building permits if County zoning is not required.

234. Civil Defense. Petitioner shall fund and construct adequate civil defense measures serving the Reclassified Area as determined by the State of Hawaii Department of Defense-Office of Civil Defense, and the County of Hawaii Civil Defense Agency.

235. Solid Waste. Petitioner shall develop a Solid Waste Management Plan in conformance with the Integrated Solid Waste Management Act, Chapter 342G, Hawaii Revised Statutes. Petitioner's Solid Waste Management Plan shall be approved by the County of Hawaii Department of Environmental Management, Solid Waste Division. The Plan shall address and encourage an awareness of the need to divert the maximum amount of waste material caused by developments away from the County's landfills.

236. Compliance with Representations to the Commission. Petitioner shall develop the Reclassified Area in substantial compliance with the representations made by the

Petitioner to the Commission in this Docket, as proposed in its Petition and in documentary evidence and testimony before the Commission. Failure to do so for any reason including economic feasibility, may result in the imposition of fines as provided by law, removal of improvements by Petitioner at Petitioner's own expense, reversion of the Reclassified Area to its former classification, a change to a more appropriate classification, or any other legal remedies.

237. Notice of Change to Ownership Interests. Petitioner shall give notice to the Commission of any intent to sell, lease, assign, place in trust, or otherwise voluntarily alter the ownership interests in the Property, prior to development of the Property.

238. Annual Reports. Petitioner shall timely provide without prior notice, annual reports to the Commission, the Office of Planning, and the County of Hawaii Planning Department in connection with the status of the development proposed for the Reclassified Area, and Petitioner's progress in complying with the conditions imposed. The annual report shall be submitted in a form prescribed by the Executive Officer of the Commission. The annual report shall be due prior to or on the anniversary date of the Commission's approval of the Petition.

239. Release of Conditions Imposed by the Commission. Petitioner may seek from the Commission full or partial release of the conditions provided herein as to all or any portion of the Reclassified Area upon evidence acceptable to the Commission of satisfaction of these conditions.

240. Recording of Conditions. Within seven (7) days of the issuance of the Commission's Decision and Order for the subject reclassification, Petitioner shall (a) record with the Bureau of Conveyances and/or the Assistant Registrar of the Land Court of State of Hawaii, as applicable, a statement that the Reclassified Area is subject to conditions imposed by the Commission in the reclassification of the Reclassified Area, and (b) file a copy of such recorded

statement with the Commission. Petitioner shall record the conditions imposed herein by the Commission with the Bureau of Conveyances and/or the Assistant Registrar of the Land Court of the State of Hawaii, as applicable, pursuant to Section 15-15-92, Hawaii Administrative Rules.

Done at Honolulu, Hawaii, this _____ day of _____, 2007, per motion on December _____, 2006.

LAND USE COMMISSION
STATE OF HAWAII

By _____
LISA M. JUDGE
Chairperson and Commissioner

By _____
MICHAEL D. FORMBY
Vice-Chairperson and Commissioner

By _____
STEVEN LEE MONTGOMERY
Vice-Chairperson and Commissioner

By _____
DUANE KANUHA
Commissioner

By _____
THOMAS CONTRADES
Commissioner

By _____
KYONG-SU IM
Commissioner

By _____
RANSOM A.K. PILTZ

Commissioner

By _____
REUBEN S.F. WONG
Commissioner

By _____
NICHOLAS W. TEVES, JR.
Commissioner

Filed and effective on
_____, 2007.

Certified by:

_____
ANTHONY J.H. CHING
Executive Officer

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of	)	DOCKET NO. A02-737
	)	
AEKO HAWAII, formerly known as U of N BENCORP	)	CERTIFICATE OF SERVICE
	)	
	)	
	)	
To Amend the Agricultural Land Use District to the Urban Land Use District for approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island, County and State of Hawaii.	)	
	)	
	)	
	)	
	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that a copy of the First Amended Findings of Fact, Conclusions of Law, and Decision and Order for a State Land Use District Boundary Amendment and Exhibits A through B were served upon the following by either hand delivery or depositing the same in the U. S. Postal Service postage prepaid, by regular or certified mail as noted:

DEL. MARY LOU KOBAYASHI
Office of Planning
P. O. Box 2359
Honolulu, Hawaii 96804-2359

CERT. BRYAN C. YEE, Esq.
Deputy Attorney General
Hale Auhau, Third Floor
425 Queen Street
Honolulu, Hawaii 96813

CERT. STEVEN S. C. LIM, Esq.
Carlsmith Ball LLP
121 Waianuenue Avenue
Hilo, Hawaii 96720

CERT. JENNIFER A. BENCK, Esq.
Carlsmith Ball LLP
1001 Bishop Street, Suite 2200
Honolulu, Hawaii 96813

CERT. CHRISTOPHER J. YUEN, Director
Planning Department
County of Hawaii
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720

CERT. LINCOLN ASHIDA, Esq.
Corporation Counsel
County of Hawaii
101 Aupuni Street, Suite 325
Hilo, Hawaii 96720-4262

CERT. WARREN ISRAELSON
AEKO HAWAII, formerly known as University of the Nations Bencorp
75-165 Hualalai Road, Second Floor
Kailua-Kona, Hawaii 96740

CERT. GEORGE ATTA, AICP
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

Dated: Honolulu, Hawaii, _____.

_____
ANTHONY J. H. CHING
Executive Officer

LINDA LINGLE
GOVERNOR

JAMES R. AIONA, JR.
LT. GOVERNOR

MARK E. RECKTENWALD
DIRECTOR

LAWRENCE M. REIFURTH
DEPUTY DIRECTOR

TUNG CHAN
COMMISSIONER OF SECURITIES

STATE OF HAWAII
BUSINESS REGISTRATION DIVISION
DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS
335 MERCHANT STREET, P.O. BOX 40
HONOLULU, HAWAII 96810

WWW.BUSINESSREGISTRATIONS.COM

I, the undersigned Director of Commerce and Consumer Affairs of the State of Hawaii, hereby certify that the attached is a true and exact copy of:

The Articles of Amendment to Change Corporate Name changing its name from U OF N BENCORP to AEKO HAWAII, filed in this Department on May 18, 2005.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Department of Commerce and Consumer Affairs, at Honolulu, Hawaii.

Dated: October 11, 2006

Mark E Recktenwald

Director of Commerce and Consumer Affairs

EXHIBIT 7

www.BusinessRegistrations.com

FORM DNP-2
7/2004

FILED 05/18/2005 08:51 AM
Business Registration Division
DEPT. OF COMMERCE AND
CONSUMER AFFAIRS
State of Hawaii

STATE OF HAWAII
DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS
Business Registration Division
335 Merchant Street
Mailing Address: P.O. Box 40, Honolulu, Hawaii 96810

ARTICLES OF AMENDMENT TO CHANGE CORPORATE NAME

(Section 414D-183, Hawaii Revised Statutes)

PLEASE TYPE OR PRINT LEGIBLY IN BLACK INK

The undersigned, duly authorized officers of the corporation submitting these Articles of Amendment, certify as follows:

1. The present name of the corporation is:

U OF N BENCORP

2. The name of the corporation is changed to:

AEKO HAWAII

3. The amendment to change the corporation name was adopted on: May (Month) 1 (Day) 2005 (Year)

(Check one)

☐ at a meeting of the ***members***:

Designation (class) Of membership	Total Number of Memberships (votes) outstanding	Total Number of Votes Entitled to be Cast By each Class	Number of Votes Cast by each class For Amendment	Number of Votes Cast by each class Against Amendment

OR

☐ by written consent of the ***members*** holding at least eighty per cent of the voting power.

OR

☑ by a sufficient vote of the ***Board of Directors*** or ***incorporators*** because member approval was not required.

4. Check one:
☐ The written approval of a specified person or persons named in the articles of incorporation was obtained.

☑ The written approval of a specified person or persons is not required.

The undersigned certifies under the penalties of Section 414D-12, Hawaii Revised Statutes, that the undersigned has read the above statements and that the same are true and correct.

Signed this 1st day of May, 2005

ERNIE WOUTERS, Secretary
(Type/Print Name & Title)

(Signature of Officer)

(Type/Print Name & Title)

(Signature of Officer)

SEE INSTRUCTIONS ON REVERSE SIDE. The articles must be signed by at least one officer of the corporation.

05/19, 0520004

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of U of N BENCORP To Amend the Agricultural Land Use District to the Urban Land Use District for Approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island County and State of Hawaii.	DOCKET NO. A02-737 CERTIFICATE OF SERVICE

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of U of N Bencorp's List of Exhibits; Exhibits "1" to "7" was duly served by certified mail, via the United States mail, postage prepaid, upon the parties listed below at their last known addresses on the date indicated below.

LAURA THIELEN, Director
Office of Planning
P. O. Box 2359
Honolulu, Hawaii 96804-2359

BRYAN C. YEE, Esq.
Deputy Attorney General
Hale Auhau, Third Floor
425 Queen Street
Honolulu, Hawaii 96813

CHRISTOPHER J. YUEN, Director
Planning Department
County of Hawaii
101 Pauahi Street, Suite 3
Hilo, Hawaii 9672

LINCOLN ASHIDA, Esq.
Corporation Counsel
County of Hawaii
101 Aupuni Street, Suite 325
Hilo, Hawaii 96720-4262

GEORGE ATTA, AICP
Group 70 International, Inc.
925 Bethel Street, Fifth Floor
Honolulu, Hawaii 96813-4307

DATED: Honolulu, Hawaii, February 26, 2007.

STEVEN S.C. LIM
JENNIFER A. BENCK

Attorney for Petitioner
U of N BENCORP,
now known as AEKO HAWAII

CARLSMITH BALL LLP

STEVEN S. C. LIM 2505
JENNIFER A. BENCK 8357
121 Waianuenue Avenue
Hilo, Hawaii 96720
Tel No. 808.935.6644
Fax No. 808.935.7975

Attorneys for Petitioner
U of N BENCORP,
now known as AEKO HAWAII

BEFORE THE LAND USE COMMISSION

OF THE STATE OF HAWAII

In the Matter of the Petition of

U of N BENCORP

To Amend the Agricultural Land Use District to the Urban Land Use District for Approximately 62 acres, Tax Map Key Nos.: (3) 7-5-10:85 and 7-5-17:06 situate at Waiaha 1st, North Kona, Island County and State of Hawaii.

DOCKET NO. A02-737

U OF N BENCORP'S LIST OF EXHIBITS; EXHIBITS "1" TO "7"; CERTIFICATE OF SERVICE

U OF N BENCORP'S LIST OF EXHIBITS

Comes now the Petitioner herein, AEKO HAWAII (hereinafter "AEKO"), a Hawaii non-profit corporation, formerly known as U of N BENCORP, by and through its attorneys, CARLSMITH BALL, LLP and hereby submits the following List of Exhibits regarding AEKO's Motion to Amend Findings of Fact, Conclusions of Law and Decision and Order in Docket No. A02-737 and AEKO's Motion to Amend Petitioner's Name and Amend Caption.