

Traffic Impact Report

Kakaako Block B Development



Prepared for:
Castle & Cooke Homes Hawaii, Inc.

Prepared by:
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February 2014

TRAFFIC IMPACT REPORT
FOR THE
KAKAAKO BLOCK B
DEVELOPMENT

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I. INTRODUCTION

A. Purpose of Study

The purpose of this study is to identify and assess the traffic impacts resulting from a proposed Kakaako Block B development in Kakaako on the island of Oahu. The development is expected to include residential units for sale and rental, as well as, commercial uses.

B. Scope of Study

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

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

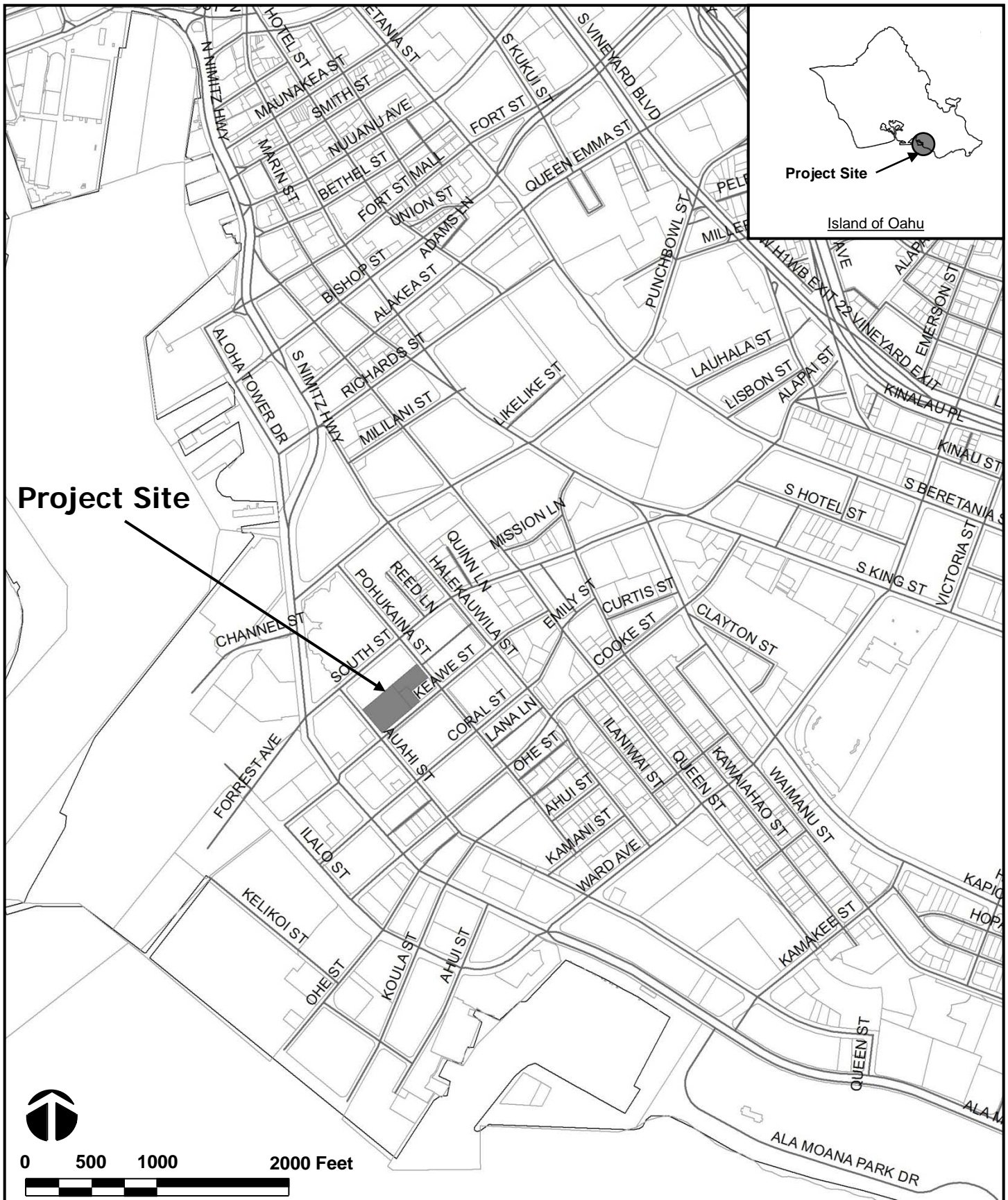
II. PROJECT DESCRIPTION

A. Location

The proposed project site is located adjacent to Pohukaina Street in Kakaako on the island of Oahu (see Figure 1). The site is bounded by residential and commercial uses to the west, Pohukaina Street to the north, Keawe Street to the east, and Auahi Street to the south. The project site is further identified as Tax Map Keys (TMKs): 2-1-054: por. 025, 027, and 032. Access to the development will be provided via driveways off Pohukaina Street and Auahi Street.

B. Project Characteristics

The project site for the proposed Kakaako Block B development currently houses various commercial/industrial uses that are expected to be replaced by the proposed project. The proposed project is a multi-use development expected to



include the following:

- Multi-family residential building with 95 one- to three-bedroom condominium units, on-site parking, and approximately 9,852 square feet of commercial/retail uses of which approximately half is expected to include restaurant uses
- Multi-family residential building with 88 studio to three-bedroom rental units with on-site parking
- Amenities such as recreational and storage areas

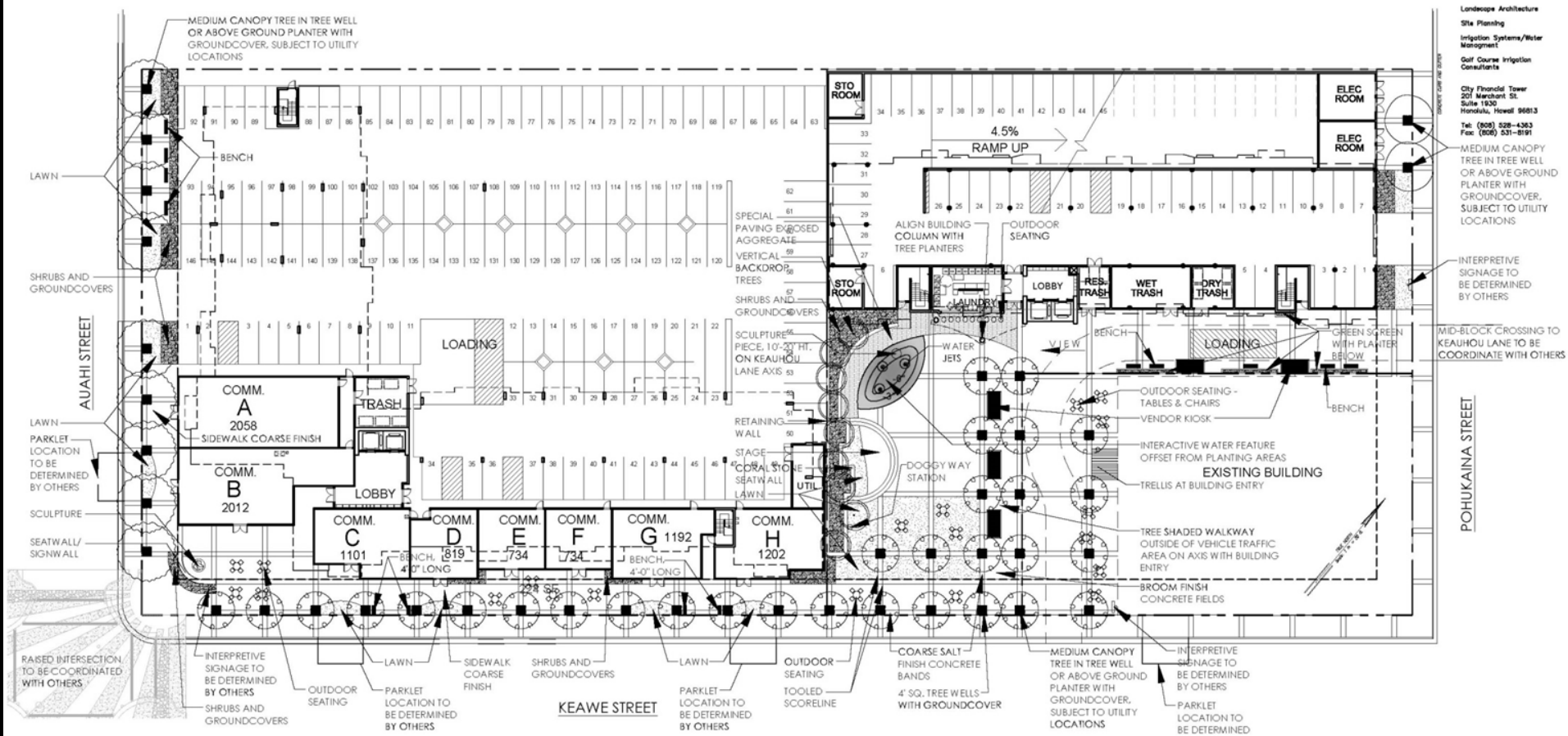
The proposed development is expected to be completed and occupied by the Year 2016 with access to the condominium residential and commercial uses provided via a new driveway off Auahi Street, and access to the rental units provided via a new driveway off Pohukaina Street. An alternate layout for the proposed development is currently under consideration which entails an internal connection between the two residential buildings to relocate access for parking associated with the commercial uses to be provided via the driveway off Pohukaina Street. Figures 2 and 3 show the proposed project site plan and the proposed site plan with the alternate layout.

III. EXISTING TRAFFIC CONDITIONS

A. Area Roadway System

The proposed project site is located adjacent to Pohukaina Street in Kakaako. Pohukaina Street is a predominantly two-lane, two-way roadway generally oriented in the east-west direction between Punchbowl Street and Kamani Street. Northeast of the project site, Pohukaina Street intersects South Street. At this signalized intersection, both approaches of Pohukaina Street have two lanes that serve all traffic movements (see Figure 4). South Street is a two-lane, two-way roadway generally oriented in the north-south direction between Ala Moana Boulevard and Pohukaina Street that transitions to a predominantly four-lane, one-way (northbound) roadway north of Pohukaina Street. At the intersection with Pohukaina Street, northbound approach of South Street has two lanes that serve all traffic movements.

East of the intersection with South Street, Pohukaina Street intersects Keawe Street. Keawe Street is a predominantly two-lane, two-way roadway generally oriented in the north-south direction between Ilalo Street and Queen Street. At this all-way stop intersection, all approaches have one lane that serves all traffic movements.



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MEDIUM CANOPY TREE IN TREE WELL OR ABOVE GROUND PLANTER WITH GROUNDCOVER, SUBJECT TO UTILITY LOCATIONS

INTERPRETIVE SIGNAGE TO BE DETERMINED BY OTHERS

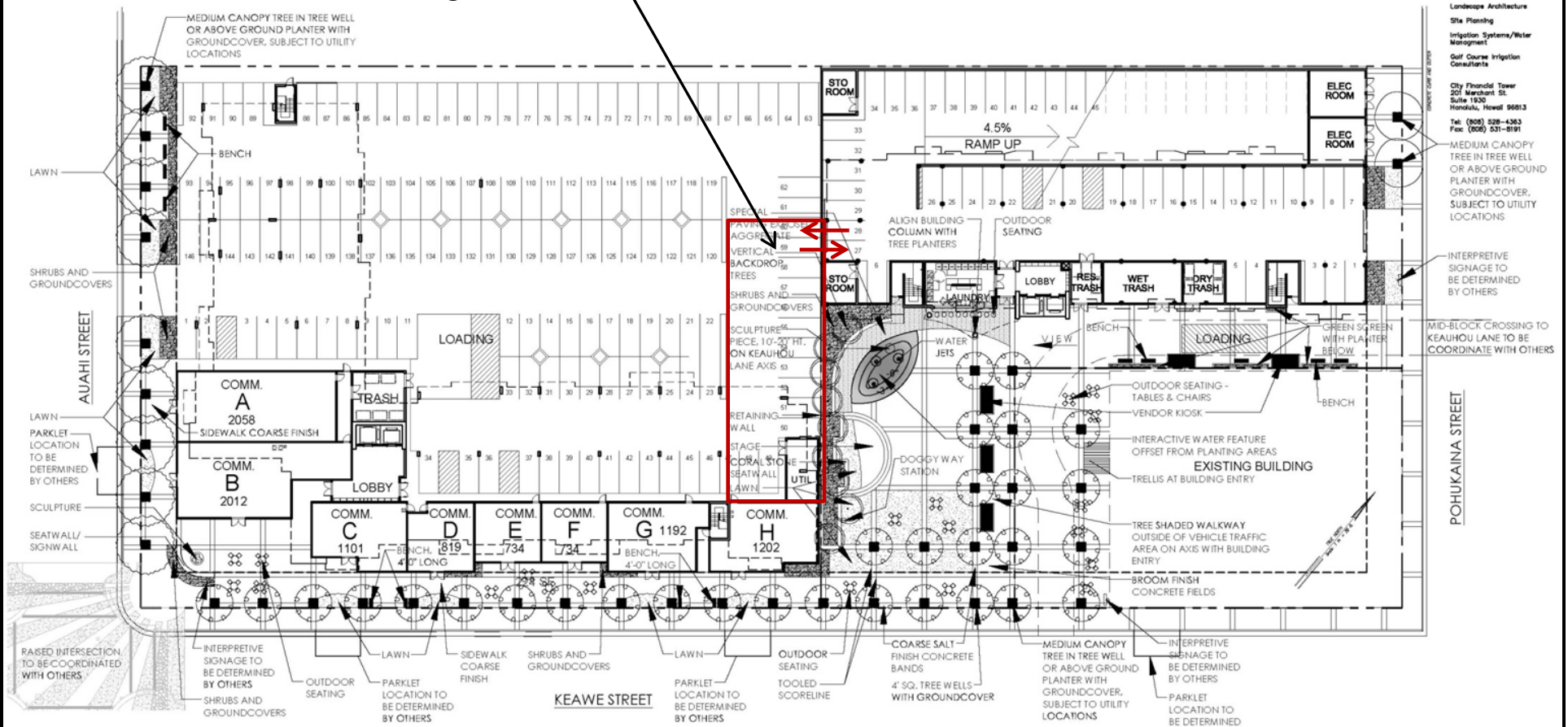
MID-BLOCK CROSSING TO KEAHOUE LANE TO BE COORDINATED WITH OTHERS



KAKAAKO BLOCK B

PROJECT SITE PLAN

Commercial Parking Area

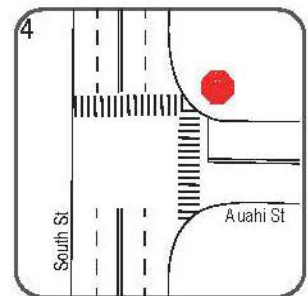
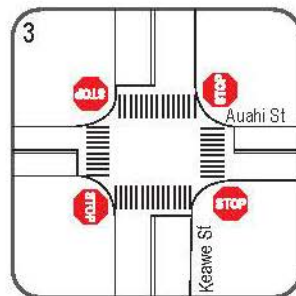
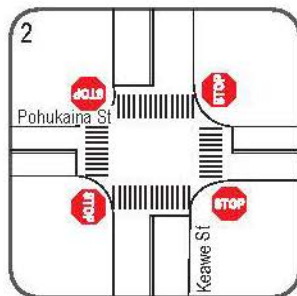
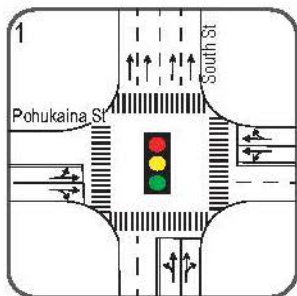
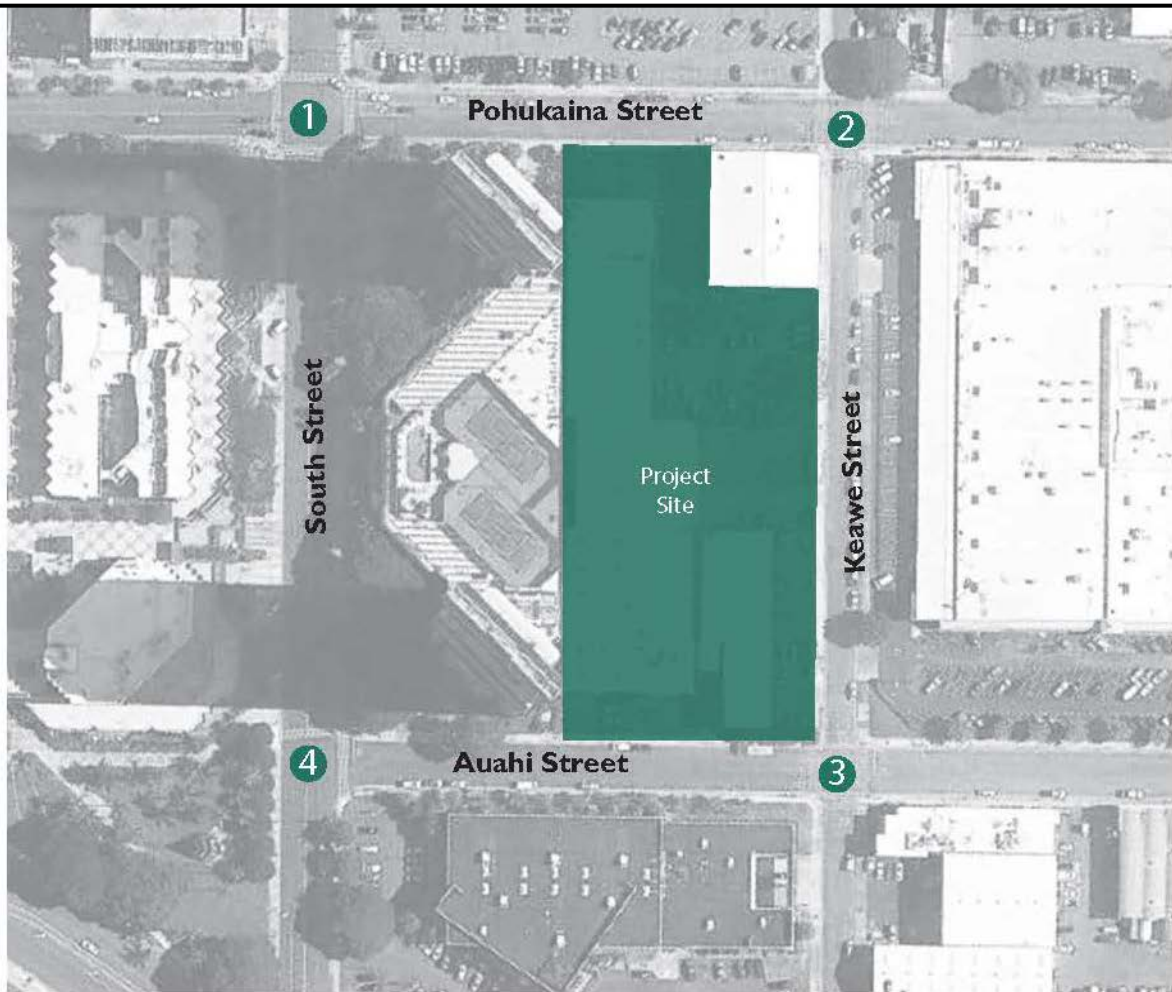


KAKAAKO BLOCK B

PROJECT SITE PLAN WITH ALTERNATE LAYOUT

FIGURE

3



LEGEND

● Study Intersection



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KAKAAKO BLOCK B

EXISTING LANE CONFIGURATIONS

FIGURE

4

South of the intersection with Pohukaina Street, Keawe Street intersects Auahi Street. In the vicinity of the project site, Auahi Street is a two-lane, two-way roadway oriented in the east-west direction between South Street and Cooke Street. At this all-way stop intersection, all approaches have one lane that serves all traffic movements.

West of Keawe Street, Auahi Street intersects South Street. At this T-intersection, the northbound approach of South Street has one through lane and a shared through and right-turn lane while the southbound approach of South Street has one through lane and a shared left-turn and through lane. The westbound approach of Auahi Street has one stop-controlled lane that serves left-turn and right-turn movements.

B. Traffic Volumes and Conditions

1. General

a. Field Investigation

Field investigations were conducted on April 14, 2011 and April 18, 2011 and consisted of manual turning movement count surveys during the morning peak hours between 6:00 AM and 9:00 AM, and the afternoon peak hours between 3:00 PM and 6:00 PM at the following intersections:

- South Street and Pohukaina Street
- Keawe Street and Pohukaina Street
- Keawe Street and Auahi Street
- South Street and Auahi Street

Appendix A includes the existing traffic count data.

b. Capacity Analysis Methodology

The highway capacity analysis performed in this study is based upon procedures presented in the “Highway Capacity Manual”, Transportation Research Board, 2000, and the “Synchro” software, developed by Trafficware. The analysis is based on the concept of Level of Service (LOS) to identify the traffic impacts associated with traffic demands during the peak periods of traffic.

LOS is a quantitative and qualitative assessment of traffic operations. Levels of Service are defined by LOS “A” through “F”; LOS “A” representing ideal or free-flow traffic operating conditions and LOS “F” unacceptable or potentially congested traffic operating conditions.

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

2. Existing Peak Hour Traffic

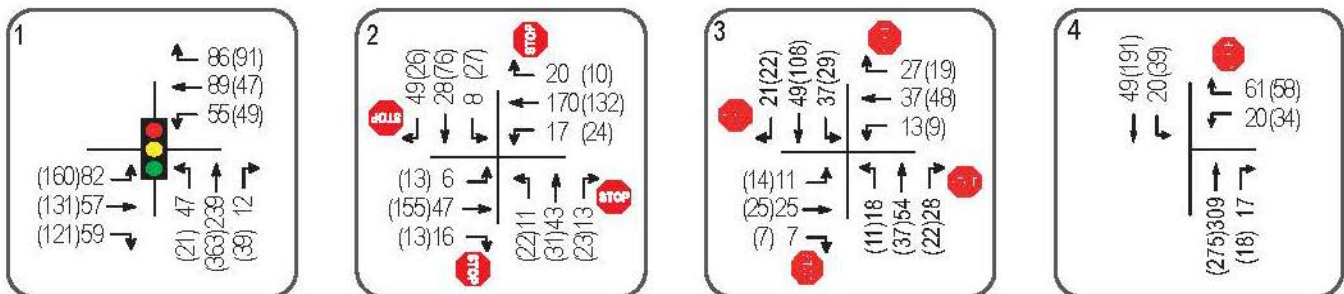
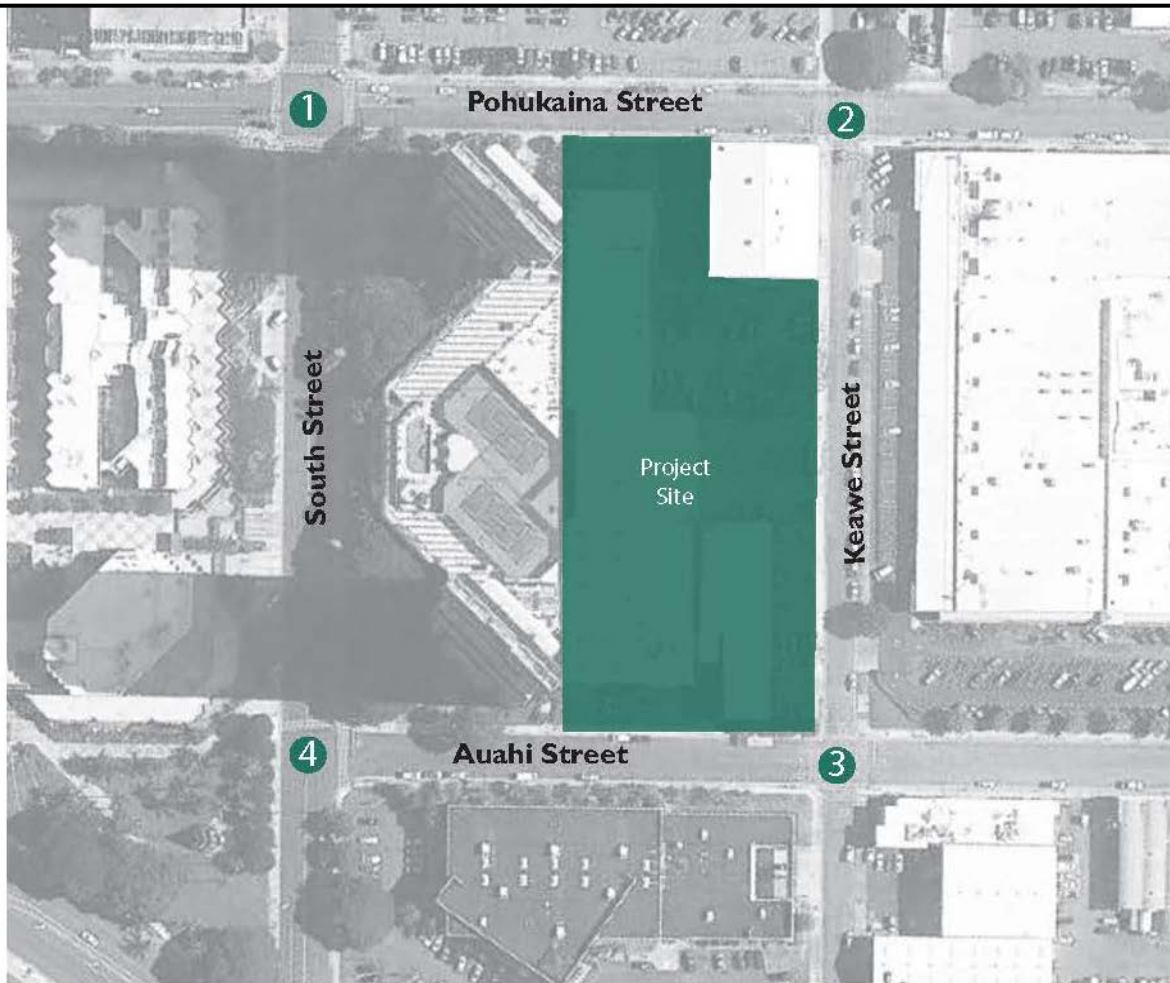
a. General

Figure 5 shows the existing AM and PM peak period traffic volumes. The AM peak hour of traffic generally occurs between 7:15 AM and 8:15 AM. The PM peak hour of traffic general occurs between the hours of 4:15 PM and 5:15 PM. The LOS analysis is based on these peak hour time periods for each intersection to identify the traffic impacts resulting from the proposed project. LOS calculations are included in Appendix C.

b. South Street and Pohukaina Street

At the intersection with Pohukaina Street, the South Street approach carries 298 vehicles northbound during the AM peak period and 423 vehicles northbound during the PM peak period. The South Street approach operates at LOS “A” during both peak periods.

The Pohukaina Street approaches of the intersection carry 198 vehicles eastbound and 230 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 412 vehicles traveling eastbound and 187 vehicles traveling westbound. Both approaches of Pohukaina Street operate at LOS “A” during both peak periods.



LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume



c. Keawe Street and Pohukaina Street

At the intersection with Pohukaina Street, Keawe Street carries 67 vehicles northbound and 85 vehicles southbound during the AM peak period. During the PM peak period, traffic volumes are higher with 76 vehicles traveling northbound and 126 vehicles traveling southbound. Both approaches of Keawe Street operate at LOS “A” during both peak periods.

The Pohukaina Street approaches of the intersection carry 69 vehicles eastbound and 207 vehicles westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 181 vehicles traveling eastbound and 166 vehicles traveling westbound. Both approaches of Pohukaina Street operate at LOS “A” during both peak periods.

d. Keawe Street and Auahi Street

At the intersection with Auahi Street, Keawe Street carries 100 vehicles northbound and 107 southbound during the AM peak period. During the PM peak period, the overall traffic volume is slightly higher with 70 vehicles traveling northbound and 159 vehicles traveling southbound. Both approaches of Keawe Street operate at LOS “A” during both peak periods.

The Auahi Street approaches of the intersection carry 43 vehicles eastbound and 77 westbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 46 vehicles traveling eastbound and 76 vehicles traveling westbound. Both approaches of Auahi Street operate at LOS “A” during both peak periods.

e. South Street and Auahi Street

At the intersection with Auahi Street, South Street carries 326 vehicles northbound and 69 vehicles southbound during the AM peak period. During the PM peak period, the overall traffic volume is higher with 293 vehicles traveling northbound and 230 vehicles

traveling southbound. Both approaches of South Street operate at LOS “A” during both peak periods.

The Auahi Street approach of the intersection carries 81 vehicles westbound during the AM peak period and 92 vehicles westbound during the PM peak period. This approach operates at LOS “B” during both peak periods.

IV. PROJECTED TRAFFIC CONDITIONS

A. Site-Generated Traffic

1. Trip Generation Methodology

The trip generation methodology used in this study is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in “Trip Generation, 9th Edition,” 2012. The ITE trip generation rates are developed empirically by correlating vehicle trip generation data with various land use characteristics such as the number of vehicle trips generated per dwelling unit or 1,000 square feet of development. The trip generation methodology developed by ITE also includes provisions for internal capture of trips. Internal capture of trips accounts for vehicles that visit more than one destination within the same area without adding external vehicular trips to the surrounding roadways. As such, the proposed peak hour trip generation for the development was adjusted for internal capture of trips. Table 1 summarizes the adjusted project site trip generation characteristics of the proposed project.

Table 1: Peak Hour Trip Generation (Adjusted)

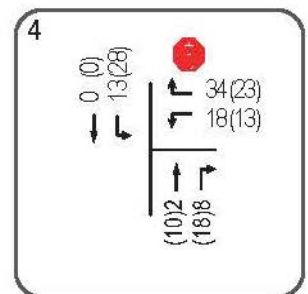
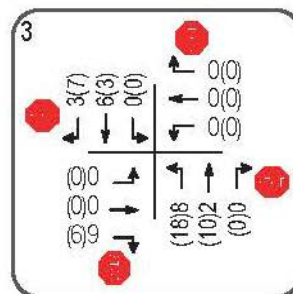
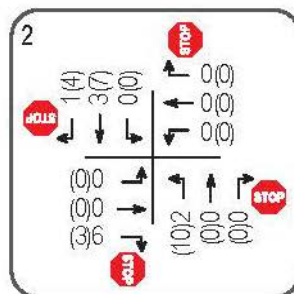
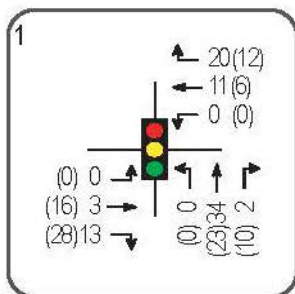
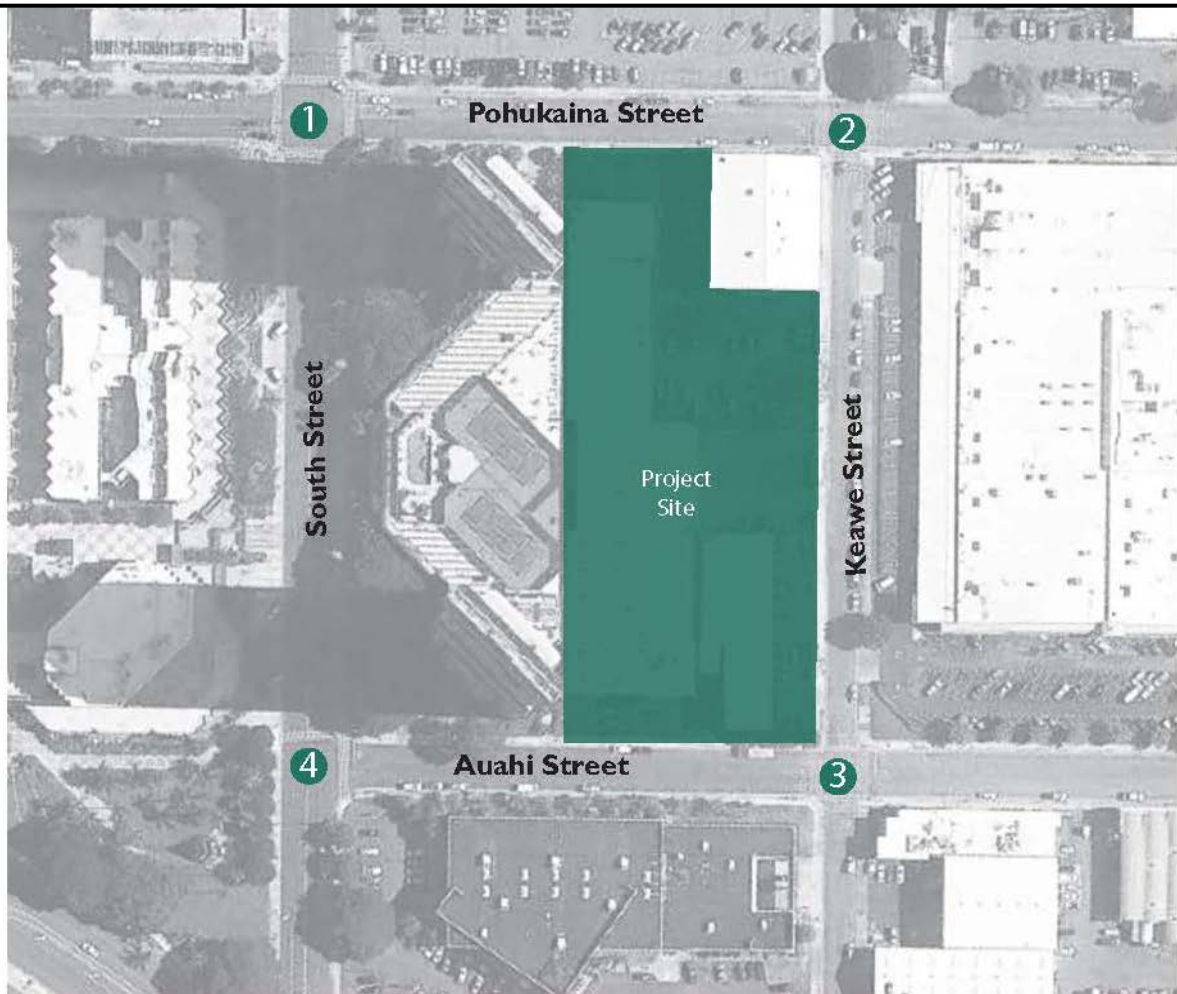
APARTMENT (RENTAL UNITS)		
INDEPENDENT VARIABLE: # of dwelling units = 88		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	8
	EXIT	37
	TOTAL	45
PM PEAK	ENTER	42
	EXIT	22
	TOTAL	64

Table 1: Peak Hour Trip Generation (Adjusted) (Cont'd)

RESIDENTIAL CONDO/TOWNHOUSE		
INDEPENDENT VARIABLE: # of dwelling units = 95		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	6
	EXIT	40
	TOTAL	46
PM PEAK	ENTER	37
	EXIT	17
	TOTAL	54
COMMERCIAL/RETAIL (SPECIALTY RETAIL CENTER)		
INDEPENDENT VARIABLE: 1,000 sf of development = 4.926		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	0
	EXIT	0
	TOTAL	0
PM PEAK	ENTER	5
	EXIT	6
	TOTAL	11
RESTAURANT (HIGH-TURNOVER SIT-DOWN RESTAURANT)		
INDEPENDENT VARIABLE: 1,000 sf of development = 4.926		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	26
	EXIT	21
	TOTAL	47
PM PEAK	ENTER	27
	EXIT	18
	TOTAL	45
TOTALS		
		PROJECTED TRIP ENDS
AM PEAK	ENTER	40
	EXIT	98
	TOTAL	138
PM PEAK	ENTER	111
	EXIT	63
	TOTAL	174

2. Trip Distribution

Figure 6 shows the distribution of site-generated traffic during the AM and PM peak periods and Figure 7 shows the distribution of site-generated traffic during the peak periods with the alternate layout. Access to the



LEGEND

● Study Intersection

xx A.M. Peak Hour Volume

(xx) P.M. Peak Hour Volume

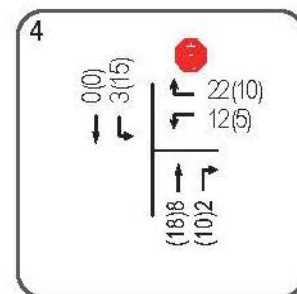
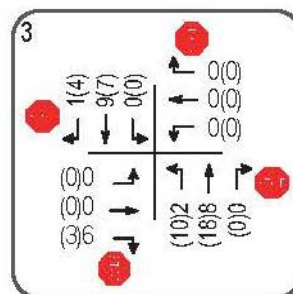
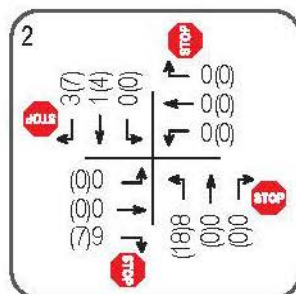
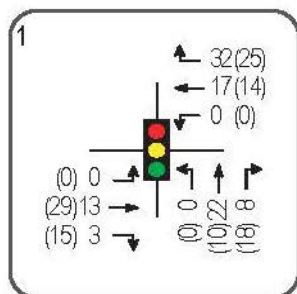
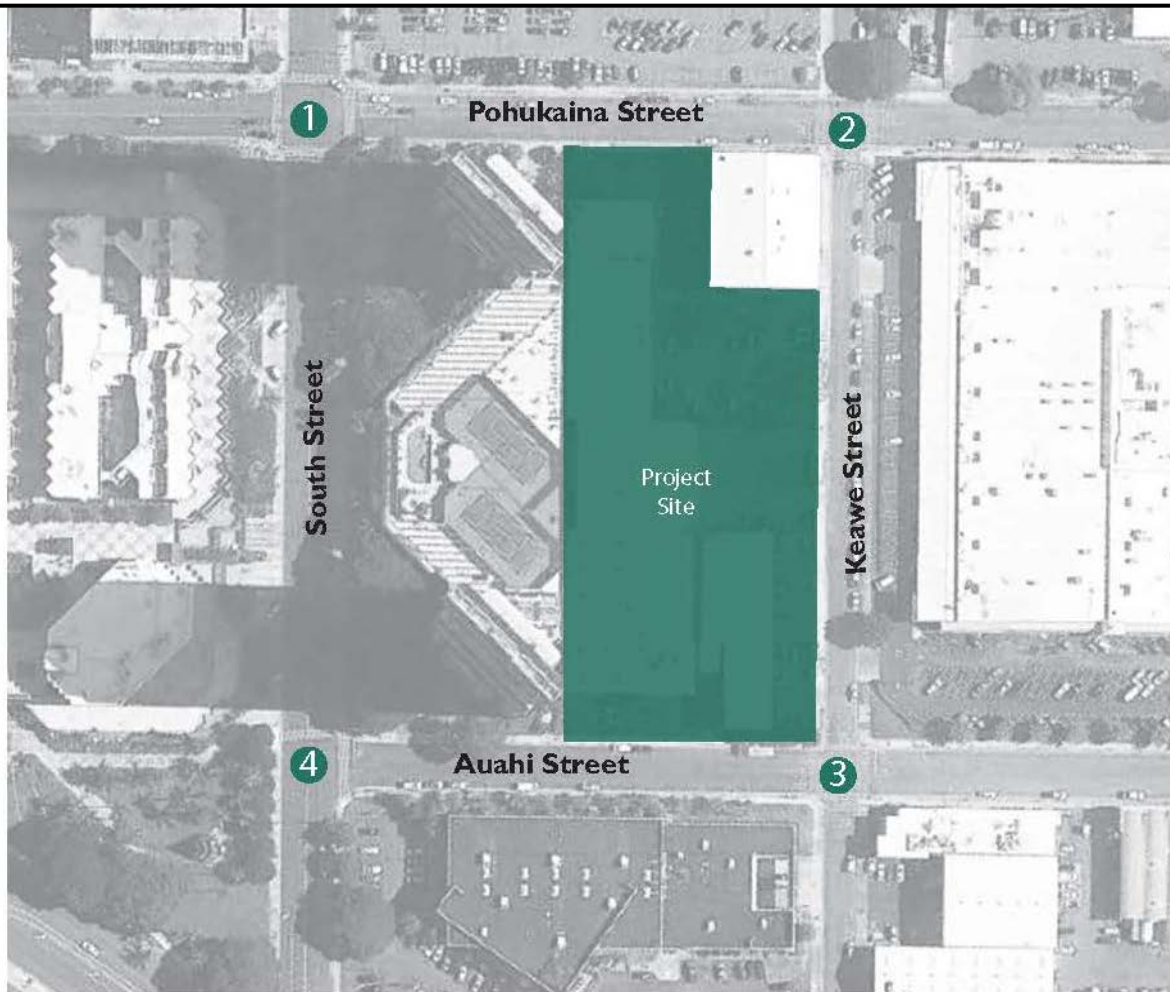


KAKAAKO BLOCK B

DISTRIBUTION OF SITE-GENERATED VEHICLES

FIGURE

6



LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume



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KAKAAKO BLOCK B

DISTRIBUTION OF SITE-GENERATED VEHICLES – ALTERNATE LAYOUT

FIGURE

7

condominium residential and commercial uses is provided via a new driveway off Auahi Street, and access to the rental units provided via a new driveway off Pohukaina Street. With the alternate layout under consideration, access to the condominium residential units would be provided via a new driveway off Auahi Street and access to the rental units and commercial uses would be provided via a new driveway off Pohukaina Street. Site-generated trips were distributed at the study intersections based upon their assumed origin/destination, relative convenience of the available routes, and existing distribution of traffic at the study intersections.

B. Through Traffic Forecasting Methodology

The travel forecast is based upon historical traffic count data obtained from the State DOT, Highways Division at survey stations located in the vicinity of the project site. The historical data indicates a stable or declining growth in traffic and, as such, an annual traffic growth rate of approximately 0.5% was conservatively assumed in the project vicinity. As such, using 2013 as the Base Year, a growth rate factor of 1.015 was applied to the existing traffic demands in the project vicinity to achieve the projected Year 2016 traffic demands.

C. Other Considerations

There are two planned developments in the vicinity of the proposed Kakaako Block B development. Halekauwila Place is currently under construction and is located on the southeast corner of the intersection of Halekauwila Street and Keawe Street. The proposed project is expected to include affordable rental units and retail space. As described in the “Traffic Impact Report for Halekauwila Place” dated October 2009, the trips associated with this future residential development were incorporated into Year 2016 without project conditions to account for the traffic expected to be generated by this development.

In addition, the Keauhou Lane development will be located one block north of the Kakaako Block B development and includes residential and commercial uses. As described in the “Traffic Impact Report for Keauhou Lane” dated December 2013, the trips associated with this future development were incorporated into Year 2016

without project conditions to account for the traffic expected to be generated by this development.

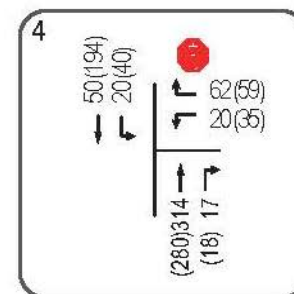
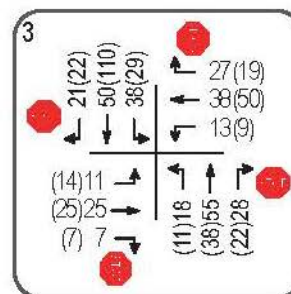
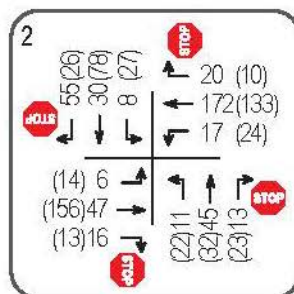
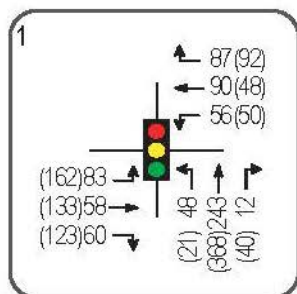
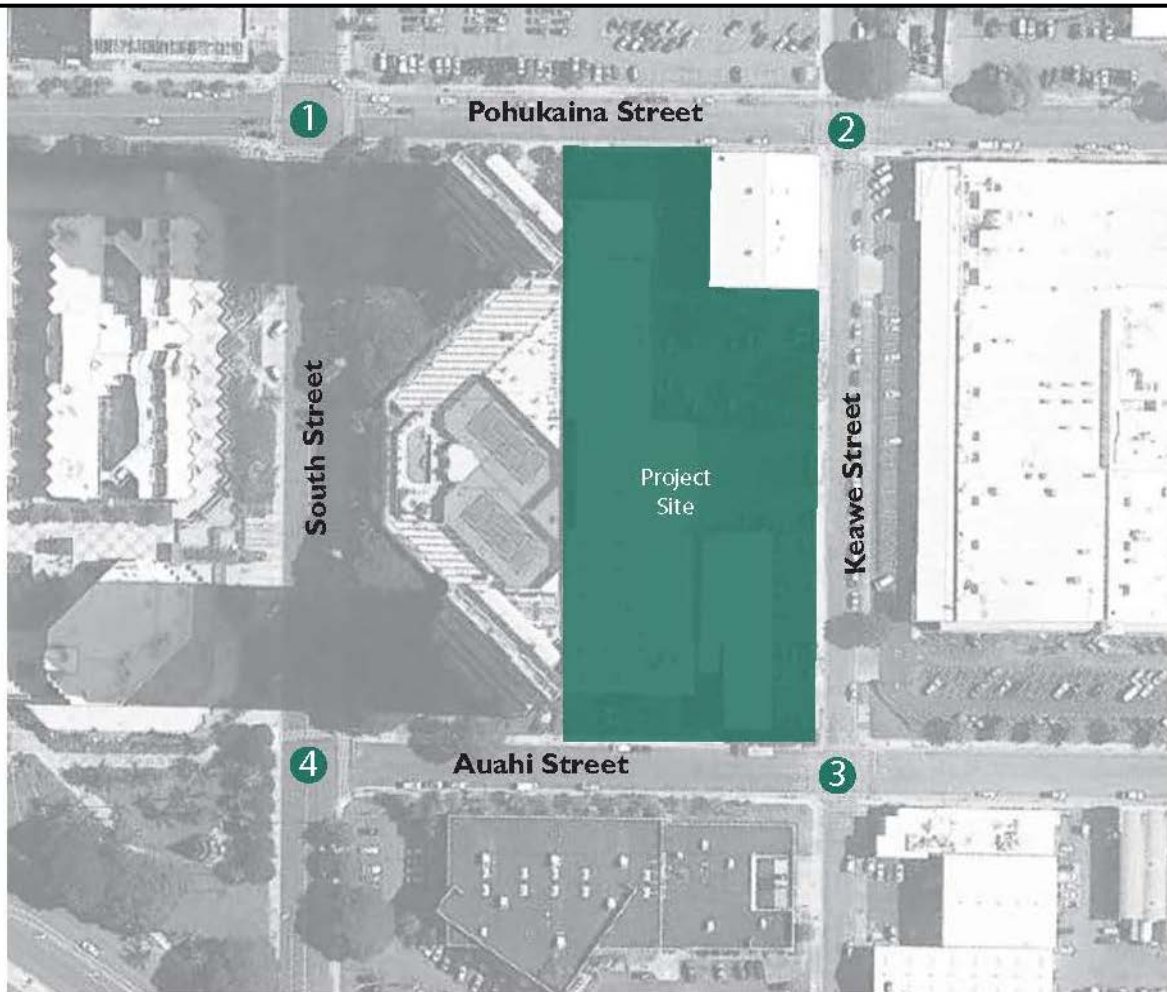
D. Total Traffic Volumes Without Project

The projected Year 2016 AM and PM peak period traffic volumes and operating conditions without the proposed Kakaako Block B development are shown in Figure 8, and summarized in Table 2. The existing levels of service are provided for comparison purposes. LOS calculations are included in Appendix D.

Table 2: Existing and Projected Year 2016 (Without Project) LOS Traffic Operating Conditions

Intersection	Approach	AM		PM	
		Exist	Year 2016 w/out Proj	Exist	Year 2016 w/out Proj
South St/ Pohukaina St	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
Keawe St/ Pohukaina St	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
Keawe St/ Auahi St	Eastbound	A	A	A	A
	Westbound	A	A	A	A
	Northbound	A	A	A	A
	Southbound	A	A	A	A
South St/ Auahi St	Westbound	B	B	B	B
	Southbound	A	A	A	A

Traffic operations under Year 2016 without project conditions are expected to remain similar to existing conditions. The approaches of the study intersections are expected to continue operating at levels of service similar existing conditions despite the anticipated increases in traffic due to ambient growth and the completion of the other development in the project vicinity.



LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume



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KAKAAKO BLOCK B

YEAR 2016 PEAK HOURS OF TRAFFIC WITHOUT PROJECT

FIGURE

8

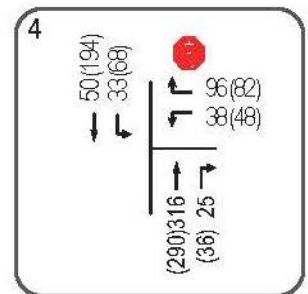
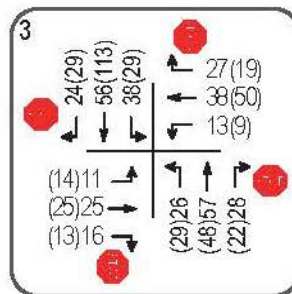
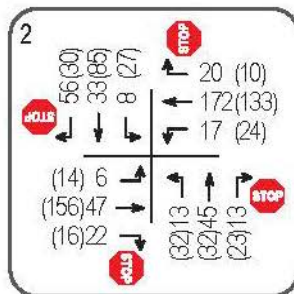
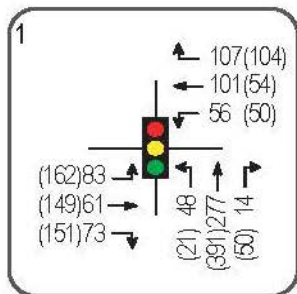
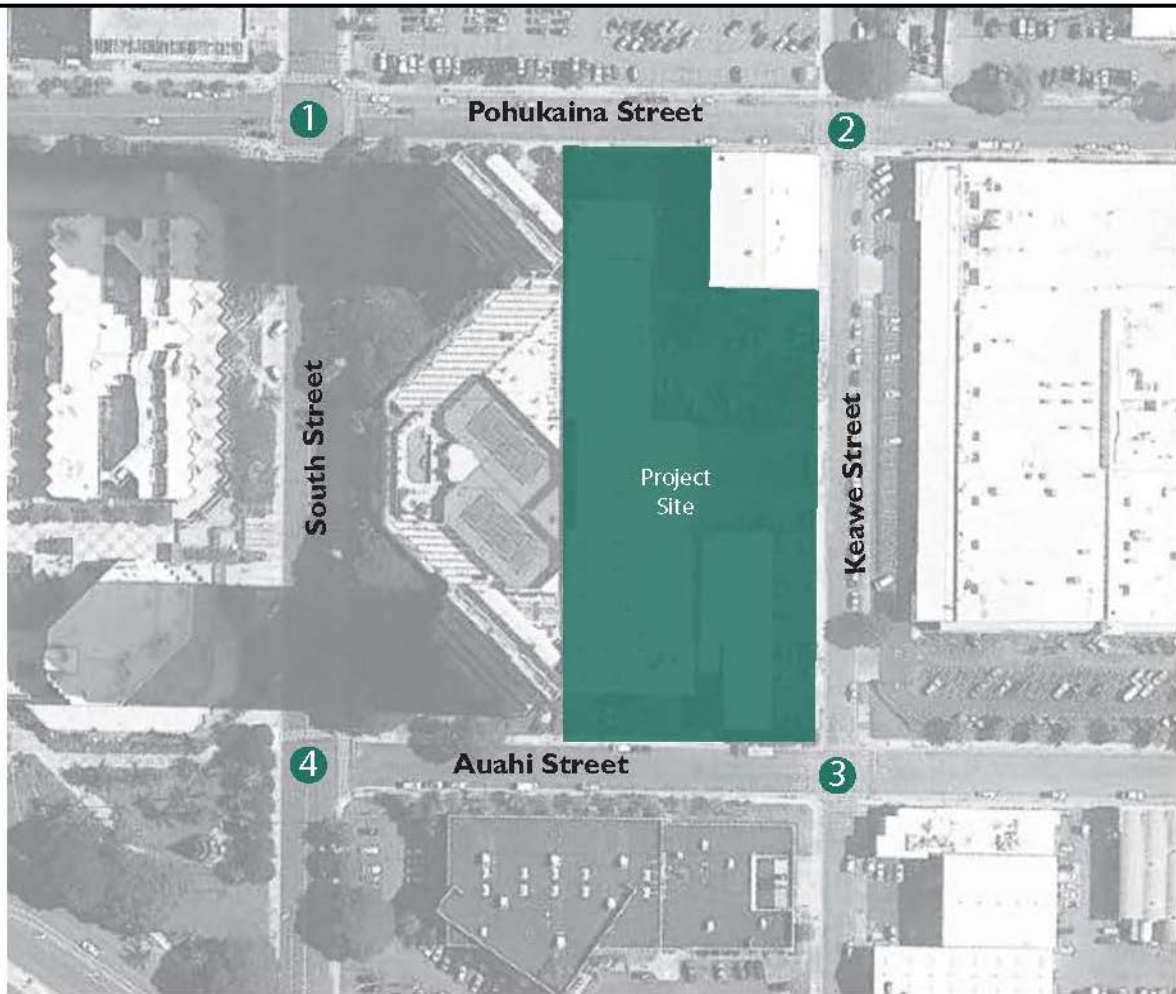
E. Total Traffic Volumes With Project

The Year 2016 cumulative AM and PM peak hour traffic conditions resulting from the projected external traffic and the proposed Kakaako Block B development are shown on Figure 9 and summarized in Table 3. The cumulative volumes consist of site-generated traffic superimposed over Year 2016 projected traffic demands. The existing and projected Year 2016 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix E.

Table 3: Existing and Projected Year 2016 (Without and With Project) LOS Traffic Operating Conditions

Intersection T	Approach	AM			PM		
		Exist	Year 2016		Exist	Year 2016	
			w/out Proj	w/ Proj		w/out Proj	w/ Proj
South St/ Pohukaina St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
Keawe St/ Pohukaina St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A
Keawe St/ Auahi St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A
South St/ Auahi St	Westbound	B	B	B	B	B	B
	Southbound	A	A	A	A	A	A

Traffic operations under Year 2016 with project conditions are expected to remain similar to existing and Year 2016 without project conditions despite the addition of new site-generated traffic to the surrounding roadways. Along Pohukaina Street, the approaches of the study intersections are expected to continue operating at LOS “A” during both peak periods. Along Auahi Street, the approaches of the study intersections are expected to continue operating at LOS “A” during the peak periods with the exception of the westbound approach of the intersection of South Street and



LEGEND

● Study Intersection

xx A.M. Peak Hour Volume

(xx) P.M. Peak Hour Volume



KAKAAKO BLOCK B

YEAR 2016 PEAK HOURS OF TRAFFIC
WITH PROJECT

FIGURE

9

Auahi Street which is expected to continue operating at LOS “B” during both peak periods.

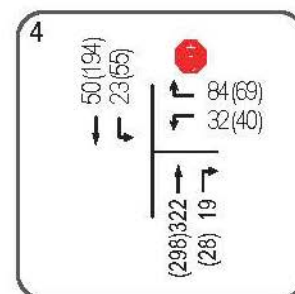
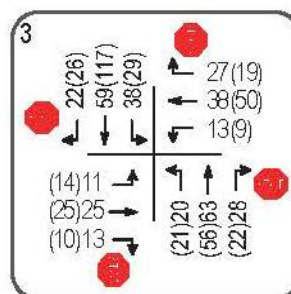
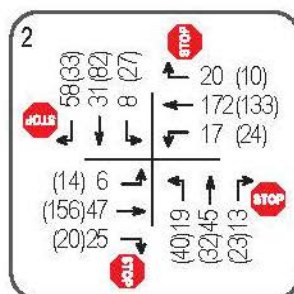
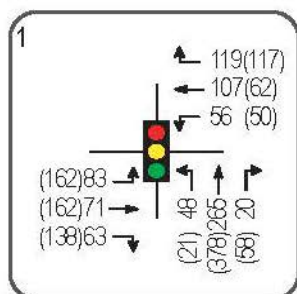
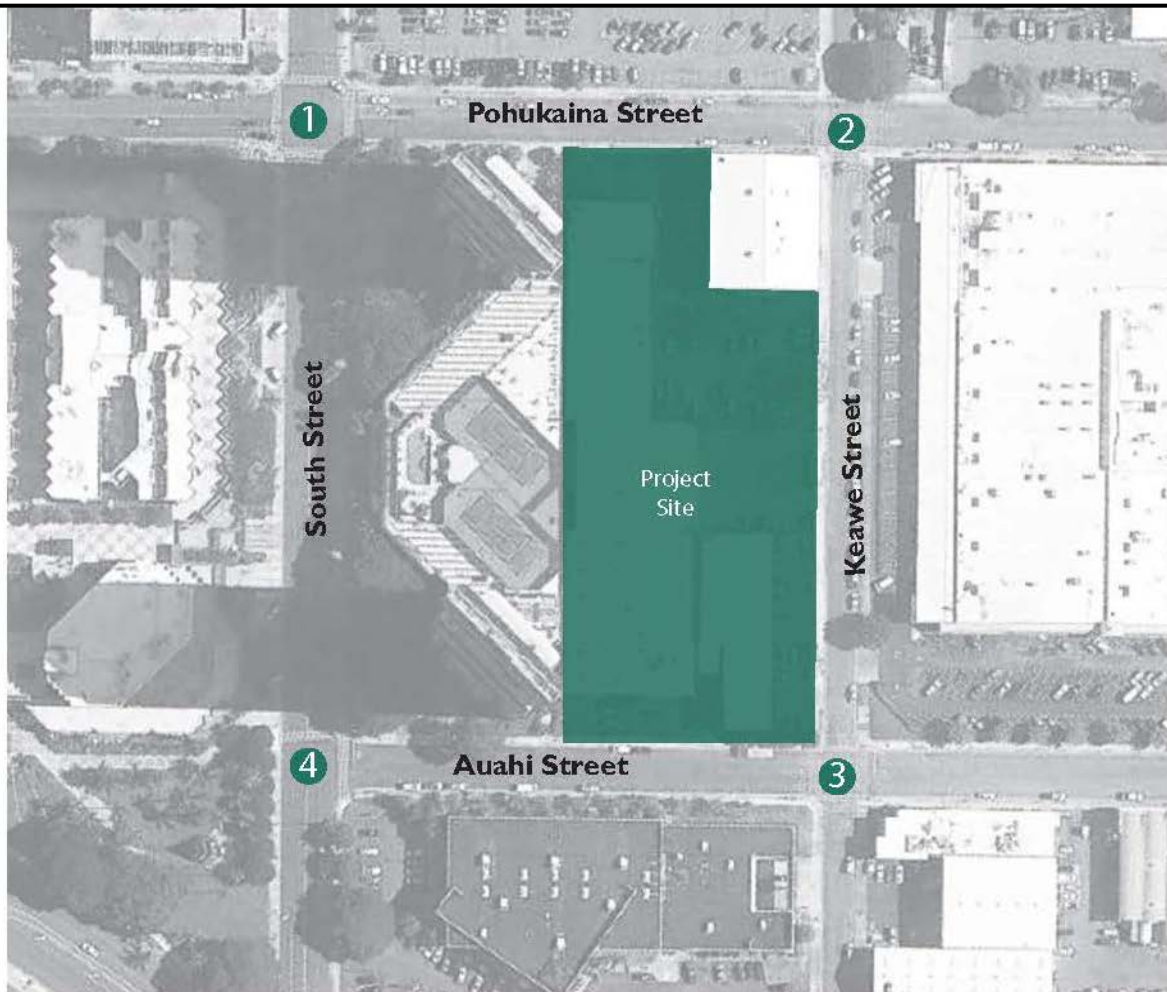
F. Total Traffic Volumes With Project and Alternate Layout

The Year 2016 cumulative AM and PM peak hour traffic conditions with the alternate layout for the Kakaako Block B development are shown in Figure 10 and summarized in Table 4. The cumulative volumes consist of site- generated traffic superimposed over Year 2016 projected traffic demands. The existing and projected Year 2016 (Without Project) operating conditions are provided for comparison purposes. LOS calculations are included in Appendix F.

Table 4: Existing and Projected Year 2016 (Without and With Project With Alternate Layout) LOS Traffic Operating Conditions

Intersection T	Approach	AM			PM		
		Exist	Year 2016		Exist	Year 2016	
			w/out Proj	w/ Proj w/ Alt Layout		w/out Proj	w/ Proj w/ Alt Layout
South St/ Pohukaina St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
Keawe St/ Pohukaina St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A
Keawe St/ Auahi St	Eastbound	A	A	A	A	A	A
	Westbound	A	A	A	A	A	A
	Northbound	A	A	A	A	A	A
	Southbound	A	A	A	A	A	A
South St/ Auahi St	Westbound	B	B	B	B	B	B
	Southbound	A	A	A	A	A	A

With the development of the Kakaako Block B project with the alternate layout, traffic operations are expected to remain similar to existing and Year 2016 without project conditions despite the addition of new site-generated traffic to the surrounding roadways. The approaches of the study intersections along Pohukaina Street and Auahi Street are expected to continue



LEGEND

- Study Intersection
- xx A.M. Peak Hour Volume
- (xx) P.M. Peak Hour Volume



KAKAAKO BLOCK B

YEAR 2016 PEAK HOURS OF TRAFFIC
WITH PROJECT WITH ALTERNATE LAYOUT

FIGURE

10

operating at LOS “A” during both peak periods with the exception of the westbound approach of the intersection of South Street and Auahi Street. This approach is expected to continue operating at LOS “B” during both peak periods.

VI. RECOMMENDATIONS

Based on the analysis of the traffic data, the following are the recommendations of this study to be incorporated in the project design.

1. Maintain sufficient sight distance for motorists to safely enter and exit the project driveway. Parking along Auahi Street and Pohukaina Street fronting the project site may need to be restricted, the extent of which should be determined during the design phase of the project.
2. Provide adequate on-site loading and off-loading service areas and prohibit off-site loading operations.
3. Provide adequate turn-around area for service, delivery, and refuse collection vehicles to maneuver on the project site to avoid vehicle-reversing maneuvers onto public roadways.
4. Provide sufficient turning radii at all project driveways to avoid or minimize vehicle encroachments to oncoming traffic lanes.
5. If access at the entrances to the parking areas are controlled, provide sufficient storage for entering vehicles at the parking area access controls (i.e., automatic gate, etc.) to ensure that queues do not extend onto the adjacent public roadways.
6. Provide pedestrian facilities throughout the project site to encourage pedestrian activity. Ensure adequate internal pedestrian circulation and connections to sidewalk facilities within the public right-of-way to facilitate pedestrian movement.

VII. CONCLUSION

The proposed Kakaako Block B development entails the replacement of existing commercial/industrial buildings in Kakaako with a new multi-use development that will include residential and commercial uses. Although access is expected to be provided via new driveways off Pohukaina Street and Auahi Street, two internal layouts are currently under consideration for the development to determine which uses would be served by the two driveways. Traffic operations in the vicinity of the proposed development are expected to remain similar to existing and without project conditions regardless of which of the two internal layouts is selected for the project. As such, with the implementation of the

aforementioned recommendations, the proposed Kakaako Block B development is not expected to have a significant impact on traffic operations in the vicinity.

APPENDIX A
EXISTING TRAFFIC COUNT DATA

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, HI 96826

Counter:5673,5676
Counted By:EM, SM
Weather:Clear

File Name : SouPoh AM
Site Code : 00000004
Start Date : 4/14/2011
Page No : 1

Groups Printed- Unshifted

		South Street Southbound					Pohukaina Street Westbound					South Street Northbound					Pohukaina Street Eastbound				
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	0	0	0	3	3	0	4	3	1	8	2	23	1	1	27	10	13	8	4	35	73
06:15 AM	0	0	0	17	17	1	3	10	3	17	4	30	2	2	38	29	11	4	2	46	118
06:30 AM	0	0	0	14	14	5	4	12	4	25	2	42	4	4	52	28	17	15	7	67	158
06:45 AM	0	0	0	11	11	9	13	17	2	41	1	39	3	9	52	15	19	6	6	46	150
Total	0	0	0	45	45	15	24	42	10	91	9	134	10	16	169	82	60	33	19	194	499
07:00 AM	0	0	0	15	15	6	22	23	3	54	7	47	3	4	61	29	20	14	13	76	206
07:15 AM	0	0	0	17	17	10	15	21	4	50	8	64	3	6	81	24	29	9	11	73	221
07:30 AM	0	0	0	30	30	9	27	44	9	89	8	64	4	13	89	23	19	8	12	62	270
07:45 AM	0	0	0	16	16	18	24	31	5	78	7	69	3	11	90	19	20	18	8	65	249
Total	0	0	0	78	78	43	88	119	21	271	30	244	13	34	321	95	88	49	44	276	946
08:00 AM	0	0	0	8	8	12	24	28	5	69	15	51	4	7	77	22	25	15	6	68	222
08:15 AM	0	0	0	10	10	13	24	18	4	59	15	47	12	7	81	20	15	13	11	59	209
08:30 AM	0	0	0	4	4	12	20	11	8	51	17	66	10	8	101	21	19	16	6	62	218
08:45 AM	0	0	0	6	6	6	14	26	2	48	9	55	3	2	69	27	30	18	4	79	202
Total	0	0	0	28	28	43	82	83	19	227	56	219	29	24	328	90	89	62	27	268	851
Grand Total	0	0	0	151	151	101	194	244	50	589	95	597	52	74	818	267	237	144	90	738	2296
Approch %	0	0	0	100		17.1	32.9	41.4	8.5		11.6	73	6.4	9		36.2	32.1	19.5	12.2		
Total %	0	0	0	6.6	6.6	4.4	8.4	10.6	2.2	25.7	4.1	26	2.3	3.2	35.6	11.6	10.3	6.3	3.9	32.1	

	South Street Southbound					Pohukaina Street Westbound					South Street Northbound					Pohukaina Street Eastbound				
Start Time	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 07:15 AM																				
07:15 AM	0	0	0	0		10	15	21	46		8	64	3	75		24	29	9	62	183
07:30 AM	0	0	0	0		9	27	44	80		7	64	4	76		23	19	8	50	206
07:45 AM	0	0	0	0		18	24	31	73		8	69	3	79		19	20	18	57	209
08:00 AM	0	0	0	0		12	24	28	64		15	51	4	70		22	25	15	62	196
Total Volume	0	0	0	0		49	90	124	263		38	248	14	300		88	93	50	231	794
% App. Total	0	0	0	0		18.6	34.2	47.1			12.7	82.7	4.7			38.1	40.3	21.6		
PHF	.000	.000	.000	.000		.681	.833	.705	.822		.633	.899	.875	.949		.917	.802	.694	.931	.950

Wilson Okamoto Corporation

1907 S. Beretania Street

Honolulu, HI 96826

Counter:5673,5676

Counted By:EM, SM

Weather:Clear

File Name : SouPoh PM

Site Code : 00000004

Start Date : 4/14/2011

Page No : 1

Groups Printed- Unshifted

Start Time	South Street Southbound					Pohukaina Street Westbound					South Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
03:00 PM	0	0	0	26	26	12	14	36	2	64	5	55	12	7	79	38	25	29	13	105
03:15 PM	0	0	0	2	2	7	8	21	3	39	4	64	5	8	81	23	17	22	6	68
03:30 PM	0	0	0	10	10	7	14	35	2	58	9	66	7	4	86	32	25	30	14	101
03:45 PM	0	0	0	8	8	11	17	34	2	64	7	71	7	4	89	33	36	32	6	107
Total	0	0	0	46	46	37	53	126	9	225	25	256	31	23	335	126	103	113	39	381
04:00 PM	0	0	0	15	15	11	14	32	4	61	5	79	6	14	104	27	23	27	9	86
04:15 PM	0	0	0	9	9	7	13	33	6	59	2	87	10	9	108	33	29	24	6	92
04:30 PM	0	0	0	21	21	11	19	34	7	71	4	82	8	10	104	44	39	30	14	127
04:45 PM	0	0	0	13	13	17	13	33	6	69	5	85	11	15	116	24	27	14	11	76
Total	0	0	0	58	58	46	59	132	23	260	16	333	35	48	432	128	118	95	40	381
05:00 PM	0	0	0	9	9	5	15	36	20	76	1	89	10	19	119	37	41	30	9	117
05:15 PM	0	0	0	11	11	13	12	25	6	56	5	73	4	8	90	25	35	22	7	89
05:30 PM	0	0	0	15	15	7	11	17	4	39	7	66	11	6	90	14	23	15	8	60
05:45 PM	0	0	0	8	8	8	16	15	2	41	4	75	6	15	100	19	19	17	30	85
Total	0	0	0	43	43	33	54	93	32	212	17	303	31	48	399	95	118	84	54	351
Grand Total	0	0	0	147	147	116	166	351	64	697	58	892	97	119	1166	349	339	292	133	1113
Approch %	0	0	0	100		16.6	23.8	50.4	9.2		5	76.5	8.3	10.2		31.4	30.5	26.2	11.9	
Total %	0	0	0	4.7	4.7	3.7	5.3	11.2	2	22.3	1.9	28.6	3.1	3.8	37.3	11.2	10.9	9.3	4.3	35.6

Start Time	South Street Southbound					Pohukaina Street Westbound					South Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
04:15 PM	0	0	0	0	0	7	13	33	3	53	2	87	10	8	99	33	29	24	86	238
04:30 PM	0	0	0	0	0	11	19	34	3	64	4	82	8	8	94	44	39	30	30	113
04:45 PM	0	0	0	0	0	17	13	33	3	63	5	85	11	10	101	24	27	14	14	65
05:00 PM	0	0	0	0	0	5	15	36	3	56	1	89	10	10	100	37	41	30	108	264
Total Volume	0	0	0	0	0	40	60	136	136	236	12	343	39	39	394	138	136	98	98	372
% App. Total	0	0	0	0	0	16.9	25.4	57.6	57.6		3	87.1	9.9	9.9		37.1	36.6	26.3	26.3	
PHF	.000	.000	.000	.000	.000	.588	.789	.944	.944	.922	.600	.963	.886	.886	.975	.784	.829	.817	.817	.823

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:15 PM

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, HI 96826

Counter: D4-3890, D4-3891
Counted By: EM, SM
Weather: Clear

File Name : KeaPoh AM
Site Code : 00000004
Start Date : 4/18/2011
Page No : 1

Groups Printed- Unshifted

Start Time	Keawe Street Southbound					Pohukaina Street Westbound					Keawe Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
06:00 AM	5	12	4	1	22	1	4	0	3	8	3	2	3	4	12	1	10	7	3	21
06:15 AM	7	9	1	4	21	2	7	5	0	14	3	5	6	3	17	0	11	1	6	18
06:30 AM	4	11	7	3	25	1	15	0	0	16	4	12	3	4	23	0	20	4	3	27
06:45 AM	8	7	8	4	27	6	23	3	0	32	4	6	6	7	23	3	23	5	5	36
Total	24	39	20	12	95	10	49	8	3	70	14	25	18	18	75	4	64	17	17	102
07:00 AM	11	11	14	8	44	5	27	4	1	37	3	12	13	3	31	0	16	3	9	28
07:15 AM	14	11	11	2	38	4	31	2	1	38	4	9	13	2	28	1	16	6	4	27
07:30 AM	12	14	16	6	48	3	52	3	0	58	9	23	9	1	42	1	17	0	5	23
07:45 AM	21	15	13	0	49	4	43	9	0	56	12	17	17	5	51	0	20	5	4	29
Total	58	51	54	16	179	16	153	18	2	189	28	61	52	11	152	2	69	14	22	107
08:00 AM	16	18	20	7	61	13	36	3	2	54	6	17	13	2	38	2	18	9	8	37
08:15 AM	10	14	21	2	47	5	27	5	2	39	6	5	10	4	25	2	13	6	2	23
08:30 AM	6	8	13	1	28	6	24	5	1	36	2	8	6	4	20	1	15	3	6	25
08:45 AM	9	15	14	1	39	6	25	4	0	35	1	7	4	6	18	3	11	5	4	23
Total	41	55	68	11	175	30	112	17	5	164	15	37	33	16	101	8	57	23	20	108
Grand Total	123	145	142	39	449	56	314	43	10	423	57	123	103	45	328	14	190	54	59	317
Apprch %	27.4	32.3	31.6	8.7		13.2	74.2	10.2	2.4		17.4	37.5	31.4	13.7		4.4	59.9	17	18.6	
Total %	8.1	9.6	9.4	2.6	29.6	3.7	20.7	2.8	0.7	27.9	3.8	8.1	6.8	3	21.6	0.9	12.5	3.6	3.9	20.9

Start Time	Keawe Street Southbound					Pohukaina Street Westbound					Keawe Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 07:30 AM																				
07:30 AM	12	14	16		42	3	52	3		58	9	23	9		41	1	17	0		18
07:45 AM	21	15	13		49	4	43	9		56	12	17	17		46	0	20	5		25
08:00 AM	16	18	20		54	13	36	3		52	6	17	13		36	2	18	9		29
08:15 AM	10	14	21		45	5	27	5		37	6	5	10		21	2	13	6		21
Total Volume	59	61	70		190	25	158	20		203	33	62	49		144	5	68	20		93
% App. Total	31.1	32.1	36.8			12.3	77.8	9.9			22.9	43.1	34			5.4	73.1	21.5		
PHF	.702	.847	.833		.880	.481	.760	.556		.875	.688	.674	.721		.783	.625	.850	.556		.802

Wilson Okamoto Corporation

1907 S. Beretania Street

Honolulu, HI 96826

Counter:D4-3890, D4-3891

Counted By:EM, SM

Weather:Clear

File Name : KeaPoh PM

Site Code : 00000004

Start Date : 4/18/2011

Page No : 1

Groups Printed- Unshifted

Start Time	Keawe Street Southbound					Pohukaina Street Westbound					Keawe Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
03:00 PM	18	17	10	2	47	16	31	6	0	53	7	22	10	14	53	0	28	4	2	34
03:15 PM	9	15	2	1	27	12	43	7	2	64	6	10	9	2	27	1	22	7	5	35
03:30 PM	7	19	7	1	34	13	49	4	1	67	9	10	5	4	28	1	21	5	2	29
03:45 PM	6	22	13	0	41	4	30	5	1	40	4	9	5	1	19	2	33	9	2	46
Total	40	73	32	4	149	45	153	22	4	224	26	51	29	21	127	4	104	25	11	144
04:00 PM	5	16	10	3	34	7	40	4	1	52	2	7	10	4	23	0	26	2	3	31
04:15 PM	2	22	7	10	41	4	44	4	2	54	2	11	8	4	25	2	21	12	5	40
04:30 PM	6	29	13	3	51	10	32	7	2	51	8	14	5	11	38	4	45	4	9	62
04:45 PM	13	25	5	5	48	12	40	7	2	61	9	10	10	6	35	7	37	7	5	56
Total	26	92	35	21	174	33	156	22	7	218	21	42	33	25	121	13	129	25	22	189
05:00 PM	9	22	4	6	41	16	35	8	0	59	9	13	6	7	35	2	21	6	9	38
05:15 PM	5	17	4	6	32	9	31	1	4	45	5	9	11	8	33	1	26	13	4	44
05:30 PM	4	10	9	7	30	9	32	4	1	46	5	9	3	5	22	1	20	5	1	27
05:45 PM	0	0	0	0	0	5	26	3	1	35	7	1	1	7	16	0	0	0	0	0
Total	18	49	17	19	103	39	124	16	6	185	26	32	21	27	106	4	67	24	14	109
Grand Total	84	214	84	44	426	117	433	60	17	627	73	125	83	73	354	21	300	74	47	442
Approch %	19.7	50.2	19.7	10.3		18.7	69.1	9.6	2.7		20.6	35.3	23.4	20.6		4.8	67.9	16.7	10.6	
Total %	4.5	11.6	4.5	2.4	23	6.3	23.4	3.2	0.9	33.9	3.9	6.8	4.5	3.9	19.1	1.1	16.2	4	2.5	23.9

Start Time	Keawe Street Southbound					Pohukaina Street Westbound					Keawe Street Northbound					Pohukaina Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
04:15 PM	2	22	7		31	4	44	4		52	2	11	8		21	2	21	12		35
04:30 PM	6	29	13		48	10	32	7		49	8	14	5		27	4	45	4		53
04:45 PM	13	25	5		43	12	40	7		59	9	10	10		29	7	37	7		51
05:00 PM	9	22	4		35	16	35	8		59	9	13	6		28	2	21	6		29
Total Volume	30	98	29		157	42	151	26		219	28	48	29		105	15	124	29		168
% App. Total	19.1	62.4	18.5			19.2	68.9	11.9			26.7	45.7	27.6			8.9	73.8	17.3		
PHF	.577	.845	.558		.818	.656	.858	.813		.928	.778	.857	.725		.905	.536	.689	.604		.792
																				.891

Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:15 PM

Honolulu, HI 96826

Weather: Clear

Weather: Clear

Groups Printed- Unshifted

Groups Filled - Unfilled																					
Keawe Street Southbound					Auahi Street Westbound					Keawe Street Northbound					Auahi Street Eastbound						
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
06:00 AM	5	6	1	4	16	0	2	3	0	5	0	3	2	2	7	4	5	2	1	12	40
06:15 AM	6	5	1	2	14	0	7	3	3	13	1	3	7	0	11	2	3	0	0	5	43
06:30 AM	5	5	2	7	19	1	4	2	0	7	1	10	5	1	17	1	8	0	3	12	52
06:45 AM	6	3	2	4	15	0	6	3	0	9	0	7	5	2	14	4	2	3	5	14	190
Total	22	19	6	17	64	1	19	11	3	34	2	23	19	5	49	11	18	5	9	43	
07:00 AM	4	5	2	1	12	0	12	3	2	17	0	23	6	3	32	1	6	0	6	13	74
07:15 AM	5	5	1	4	15	4	10	3	1	18	0	14	3	2	19	2	5	1	0	8	60
07:30 AM	4	12	3	4	23	1	17	4	5	17	7	20	8	1	36	4	7	1	5	17	93
07:45 AM	12	19	7	5	43	1	12	12	0	25	5	16	13	4	38	2	1	0	5	8	114
Total	25	41	13	14	93	6	38	23	10	77	12	73	30	10	125	9	19	2	16	46	341
08:00 AM	13	13	5	1	32	5	12	6	4	27	6	9	5	3	23	3	9	1	4	17	99
08:15 AM	8	5	6	2	21	6	9	4	1	20	0	9	2	0	11	2	8	5	1	16	68
08:30 AM	3	3	2	2	10	2	9	4	2	17	4	8	5	2	19	1	1	2	1	5	51
08:45 AM	6	14	5	3	28	1	9	5	3	18	1	6	6	4	17	3	7	0	1	11	74
Total	30	35	18	8	91	14	39	19	10	82	11	32	18	9	70	9	25	8	7	49	292
Grand Total	77	95	37	39	248	21	96	53	23	193	25	128	67	24	244	29	62	15	32	138	823
Approch %	31	38.3	14.9	15.7		10.9	49.7	27.5	11.9		10.2	52.5	27.5	9.8		21	44.9	10.9	23.2		
Total %	9.4	11.5	4.5	4.7	30.1	2.6	11.7	6.4	2.8	23.5	3	15.6	8.1	2.9	29.6	3.5	7.5	1.8	3.9	16.8	

[illegible][illegible]

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, HI 96826

Counter:D4-5671, D4-5674
Counted By:RF, SF
Weather:Clear

File Name : KeaAua PM
Site Code : 00000005
Start Date : 4/18/2011
Page No : 1

Groups Printed- Unshifted

Start Time	Keawe Street Southbound					Auahi Street Westbound					Keawe Street Northbound					Auahi Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
03:00 PM	8	25	14	2	49	5	14	9	2	30	0	6	3	9	18	1	10	4	6	21
03:15 PM	5	22	9	0	36	4	10	4	2	20	2	12	3	2	19	4	8	3	0	15
03:30 PM	9	19	6	8	42	7	13	9	3	32	2	3	6	1	12	2	7	1	1	11
03:45 PM	1	19	4	4	28	4	9	6	1	20	2	7	6	8	23	3	9	0	1	13
Total	23	85	33	14	155	20	46	28	8	102	6	28	18	20	72	10	34	8	8	60
04:00 PM	8	13	7	1	29	6	12	3	2	23	2	7	6	3	18	3	12	1	2	18
04:15 PM	10	22	4	2	38	3	13	5	5	26	5	8	1	3	17	1	5	1	3	10
04:30 PM	7	30	5	5	47	3	13	7	2	25	1	5	10	1	17	3	6	3	3	15
04:45 PM	6	33	5	3	47	1	13	1	0	15	2	13	6	2	23	5	5	1	4	15
Total	31	98	21	11	161	13	51	16	9	89	10	33	23	9	75	12	28	6	12	58
05:00 PM	6	23	8	5	42	2	9	6	1	18	3	11	5	2	21	5	9	2	2	18
05:15 PM	7	17	6	2	32	5	5	7	2	19	0	7	6	3	16	3	8	1	1	13
05:30 PM	3	19	2	4	28	3	13	4	3	23	0	3	3	9	15	1	6	4	0	11
05:45 PM	3	3	5	0	11	2	3	0	1	6	1	1	6	5	13	3	4	0	1	8
Total	19	62	21	11	113	12	30	17	7	66	4	22	20	19	65	12	27	7	4	50
Grand Total	73	245	75	36	429	45	127	61	24	257	20	83	61	48	212	34	89	21	24	168
Approch %	17	57.1	17.5	8.4		17.5	49.4	23.7	9.3		9.4	39.2	28.8	22.6		20.2	53	12.5	14.3	
Total %	6.8	23	7	3.4	40.2	4.2	11.9	5.7	2.3	24.1	1.9	7.8	5.7	4.5	19.9	3.2	8.3	2	2.3	15.8

Start Time	Keawe Street Southbound					Auahi Street Westbound					Keawe Street Northbound					Auahi Street Eastbound				
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 04:15 PM																				
04:15 PM	10	22	4		36	3	13	5		21	5	8	1		14	1	5	1		7
04:30 PM	7	30	5		42	3	13	7		23	1	5	10		16	3	6	3		12
04:45 PM	6	33	5		44	1	13	1		15	2	13	6		21	5	5	1		11
05:00 PM	6	23	8		37	2	9	6		17	3	11	5		19	5	9	2		16
Total Volume	29	108	22		159	9	48	19		76	11	37	22		70	14	25	7		46
% App. Total	18.2	67.9	13.8			11.8	63.2	25			15.7	52.9	31.4			30.4	54.3	15.2		
PHF	.725	.818	.688		.903	.750	.923	.679		.826	.550	.712	.550		.833	.700	.694	.583		.719

Wilson Okamoto Corporation

1907 S. Beretania Street

Honolulu, HI 96826

Counter:0769,3889

Counted By:PA,JH

Weather:Clear

File Name : SouAua AM
Site Code : 00000002
Start Date : 4/14/2011
Page No : 1

Groups Printed- Unshifted

	South Street Southbound					Auahi Street Westbound					South Street Northbound					Eastbound	
	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	App. Total	Int. Total
Start Time	8	12	0	7	27	2	0	4	3	9	0	29	4	0	33	0	69
06:00 AM																	
06:15 AM	5	5	0	5	15	5	0	4	4	13	0	46	10	0	56	0	84
06:30 AM	11	6	0	6	23	5	0	7	3	15	0	50	1	0	51	0	89
06:45 AM	4	9	0	4	17	3	0	7	2	12	0	52	2	0	54	0	83
Total	28	32	0	22	82	15	0	22	12	49	0	177	17	0	194	0	325
07:00 AM	9	11	0	8	28	2	0	9	8	19	0	55	5	0	60	0	107
07:15 AM	3	14	0	6	23	4	0	18	0	22	0	67	6	0	73	0	118
07:30 AM	3	14	0	10	27	2	0	9	1	12	0	89	4	0	93	0	132
07:45 AM	5	12	0	11	28	7	0	22	6	35	0	73	5	0	78	0	141
Total	20	51	0	35	106	15	0	58	15	88	0	284	20	0	304	0	498
08:00 AM	9	9	0	6	24	7	0	12	8	27	0	80	2	0	82	0	133
08:15 AM	5	13	0	4	22	5	0	10	2	17	0	70	5	0	75	0	114
08:30 AM	10	14	0	12	36	4	0	16	7	27	0	74	2	0	76	0	139
08:45 AM	4	16	0	8	28	1	0	13	2	16	0	65	4	0	69	0	113
Total	28	52	0	30	110	17	0	51	19	87	0	289	13	0	302	0	499
Grand Total	76	135	0	87	298	47	0	131	46	224	0	750	50	0	800	0	1322
Approch %	25.5	45.3	0	29.2		21	0	58.5	20.5		0	93.8	6.2	0			
Total %	5.7	10.2	0	6.6	22.5	3.6	0	9.9	3.5	16.9	0	56.7	3.8	0	60.5	0	

Start Time	South Street Southbound					Auahi Street Westbound					South Street Northbound					Eastbound				
	Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total		Left	Thru	Right	App. Total	
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																				
Peak Hour for Entire Intersection Begins at 07:15 AM																				
07:15 AM	3	14	0	17		4	0	18	22		0	67	6	73		0				112
07:30 AM	3	14	0	17		2	0	9	11		0	89	4	93		0				121
07:45 AM	5	12	0	17		7	0	22	29		0	73	5	78		0				124
08:00 AM	9	9	0	18		7	0	12	19		0	80	2	82		0				119
Total Volume	20	49	0	69		20	0	61	81		0	309	17	326		0				476
% App. Total	29	71	0			24.7	0	75.3			0	94.8	5.2							
PHF	.556	.875	.000	.958		.714	.000	.693	.698		.000	.868	.708	.876		.000				.960

Wilson Okamoto Corporation

1907 S. Beretania Street
Honolulu, HI 96826

Counter:0769, 3889
Counted By:PA, JH
Weather:Clear

File Name : SouAuaPM
Site Code : 00000002
Start Date : 4/14/2011
Page No : 1

Groups Printed- Unshifted													
South Street Southbound							Auahi Street Westbound						
Start Time	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
03:00 PM	6	41	0	6	53		12	0	12	7	31	0	
03:15 PM	7	31	0	7	45		16	0	12	3	31	0	
03:30 PM	11	34	0	9	54		9	0	8	4	21	0	
03:45 PM	12	31	0	5	48		8	0	14	1	23	0	
Total	36	137	0	27	200		45	0	46	15	106	0	
04:00 PM	9	55	0	12	76		5	0	12	13	30	0	
04:15 PM	13	34	0	6	53		11	0	14	6	31	0	
04:30 PM	7	55	0	17	79		10	0	18	8	36	0	
04:45 PM	10	47	0	5	62		8	0	14	3	25	0	
Total	39	191	0	40	270		34	0	58	30	122	0	
05:00 PM	10	44	0	6	60		9	0	6	13	28	0	
05:15 PM	6	49	0	7	62		12	0	10	7	29	0	
05:30 PM	2	26	0	9	37		9	0	10	3	22	0	
05:45 PM	12	26	0	3	41		3	0	11	2	16	0	
Total	30	145	0	25	200		33	0	37	25	95	0	
Grand Total	105	473	0	92	670		112	0	141	70	323	0	
Apprch %	15.7	70.6	0	13.7	36.8		34.7	0	43.7	21.7	17.8	0	
Total %	5.8	26	0	5.1	36.8		6.2	0	7.8	3.8	17.8	0	

South Street Southbound							Auahi Street Westbound						
Start Time	Left	Thru	Right	Peds	App. Total		Left	Thru	Right	Peds	App. Total		
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1													
Peak Hour for Entire Intersection Begins at 04:00 PM													
04:00 PM	9	55	0	12	64		5	0	12	17	67	0	
04:15 PM	13	34	0	6	47		11	0	14	25	83	0	
04:30 PM	7	55	0	17	62		10	0	18	28	67	0	
04:45 PM	10	47	0	5	57		8	0	14	22	76	0	
Total Volume	39	191	0	40	230		34	0	58	92	293	0	
% App. Total PHF	17	83	0	63	.898		37	0	63	93.9	883	.000	
	.750	.868	.000	.806	.821		.773	.000	.900	.883	.000	.979	

APPENDIX B

LEVEL OF SERVICE DEFINITIONS

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

Level of Service (LOS) criteria are given in Table 1. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. If the degree of saturation is greater than about 0.9, average control delay is significantly affected by the length of the analysis period.

**Table 1: Level-of-Service Criteria for
Unsignalized Intersections**

Level of Service	Average Control Delay (Sec/Veh)
A	≤ 10.0
B	>10.0 and ≤ 15.0
C	>15.0 and ≤ 25.0
D	>25.0 and ≤ 35.0
E	>35.0 and ≤ 50.0
F	>50.0

LEVEL OF SERVICE DEFINITIONS

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Level of Service (LOS) can be characterized for the entire intersection, each intersection approach, and each lane group. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control and volume-to-capacity ratio are used to characterize LOS for a lane group. Delay quantifies the increase in travel time due to traffic signal control. It is also a surrogate measure of driver discomfort and fuel consumption. The volume-to-capacity ratio quantifies the degree to which a phase's capacity is utilized by a lane group.

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

Level of Service	LOS by Volume-to-Capacity Ratio
A	≤ 10
B	$>10 - 20$
C	$>20 - 35$
D	$>35 - 55.0$
E	$>55.0 - 80.0$
F	>80.0

Level of Service A describes operation with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersection without stopping.

Level of Service B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.

Level of Service C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.

Level of Service D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.

Level of Service E describes operation with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.

Level of Service F describes operation with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. The level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.
















APPENDIX C

CAPACITY ANALYSIS CALCULATIONS
EXISTING PEAK PERIOD TRAFFIC ANALYSIS

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St
















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	82	57	59	55	89	86	47	239	12	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.96			0.94			0.99				
Flt Protected		0.98			0.99			0.99				
Satd. Flow (prot)		3313			3301			3491				
Flt Permitted		0.77			0.84			0.99				
Satd. Flow (perm)		2616			2795			3491				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	90	63	65	60	98	95	52	263	13	0	0	0
RTOR Reduction (vph)	0	50	0	0	73	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	168	0	0	180	0	0	323	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		5.4			5.4			8.0				
Effective Green, g (s)		5.4			5.4			8.0				
Actuated g/C Ratio		0.23			0.23			0.34				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		603			645			1193				
v/s Ratio Prot												
v/s Ratio Perm		0.06			0.06			0.09				
v/c Ratio		0.28			0.28			0.27				
Uniform Delay, d1		7.4			7.4			5.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.2			0.1				
Delay (s)		7.7			7.6			5.7				
Level of Service		A			A			A				
Approach Delay (s)		7.7			7.6			5.7			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.8									A
HCM 2000 Volume to Capacity ratio			0.27									
Actuated Cycle Length (s)			23.4							10.0		
Intersection Capacity Utilization			33.5%							A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	131	121	49	47	91	21	363	39	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.96			0.93			0.99				
Flt Protected		0.98			0.99			1.00				
Satd. Flow (prot)		3319			3238			3481				
Flt Permitted		0.78			0.78			1.00				
Satd. Flow (perm)		2635			2562			3481				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	136	126	51	49	95	22	378	41	0	0	0
RTOR Reduction (vph)	0	84	0	0	64	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	345	0	0	131	0	0	427	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		9.6			9.6			9.4				
Effective Green, g (s)		9.6			9.6			9.4				
Actuated g/C Ratio		0.33			0.33			0.32				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		872			848			1128				
v/s Ratio Prot												
v/s Ratio Perm		c0.13			0.05			0.12				
v/c Ratio		0.40			0.16			0.38				
Uniform Delay, d1		7.5			6.8			7.5				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.1			0.2				
Delay (s)		7.8			6.9			7.8				
Level of Service		A			A			A				
Approach Delay (s)		7.8			6.9			7.8			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.6									A
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			29.0									10.0
Intersection Capacity Utilization			42.2%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	47	16	17	170	20	11	43	13	8	28	49
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	8	59	20	22	215	25	14	54	16	10	35	62
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	87	262	85	108								
Volume Left (vph)	8	22	14	10								
Volume Right (vph)	20	25	16	62								
Hadj (s)	-0.09	-0.01	-0.05	-0.29								
Departure Headway (s)	4.6	4.5	4.8	4.5								
Degree Utilization, x	0.11	0.33	0.11	0.14								
Capacity (veh/h)	729	769	690	727								
Control Delay (s)	8.2	9.6	8.4	8.3								
Approach Delay (s)	8.2	9.6	8.4	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.9								
Level of Service				A								
Intersection Capacity Utilization				26.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	13	155	13	24	132	10	22	31	23	27	76	26
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	14	165	14	26	140	11	23	33	24	29	81	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	193	177	81	137								
Volume Left (vph)	14	26	23	29								
Volume Right (vph)	14	11	24	28								
Hadj (s)	0.01	0.03	-0.09	-0.05								
Departure Headway (s)	4.7	4.7	4.9	4.9								
Degree Utilization, x	0.25	0.23	0.11	0.19								
Capacity (veh/h)	722	717	670	682								
Control Delay (s)	9.2	9.1	8.5	9.0								
Approach Delay (s)	9.2	9.1	8.5	9.0								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.0								
Level of Service				A								
Intersection Capacity Utilization				29.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St

















2/21/2014

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control		Stop			Stop			Stop			Stop									
Volume (vph)	11	25	7	13	37	27	18	54	28	37	49	21								
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82								
Hourly flow rate (vph)	13	30	9	16	45	33	22	66	34	45	60	26								
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total (vph)	52	94	122	130																
Volume Left (vph)	13	16	22	45																
Volume Right (vph)	9	33	34	26																
Hadj (s)	-0.01	-0.14	-0.10	-0.01																
Departure Headway (s)	4.6	4.4	4.3	4.4																
Degree Utilization, x	0.07	0.11	0.15	0.16																
Capacity (veh/h)	730	764	801	784																
Control Delay (s)	7.9	8.0	8.0	8.2																
Approach Delay (s)	7.9	8.0	8.0	8.2																
Approach LOS	A	A	A	A																
Intersection Summary																				
Delay			8.0																	
Level of Service			A																	
Intersection Capacity Utilization			22.4%	ICU Level of Service		A														
Analysis Period (min)			15																	

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St










2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	25	7	9	48	19	11	37	22	29	108	22
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	27	7	10	51	20	12	39	23	31	115	23
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	49	81	74	169								
Volume Left (vph)	15	10	12	31								
Volume Right (vph)	7	20	23	23								
Hadj (s)	0.00	-0.09	-0.12	-0.01								
Departure Headway (s)	4.5	4.4	4.3	4.3								
Degree Utilization, x	0.06	0.10	0.09	0.20								
Capacity (veh/h)	736	761	804	807								
Control Delay (s)	7.8	7.9	7.7	8.3								
Approach Delay (s)	7.8	7.9	7.7	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.0								
Level of Service				A								
Intersection Capacity Utilization				23.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St










2/21/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	61	309	17	20	49
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	64	322	18	21	51
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						623
pX, platoon unblocked						
vC, conflicting volume	398	170			340	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	398	170			340	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	92			98	
cM capacity (veh/h)	570	844			1216	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	84	215	125	38	34	
Volume Left	21	0	0	21	0	
Volume Right	64	0	18	0	0	
cSH	755	1700	1700	1216	1700	
Volume to Capacity	0.11	0.13	0.07	0.02	0.02	
Queue Length 95th (ft)	9	0	0	1	0	
Control Delay (s)	10.4	0.0	0.0	4.5	0.0	
Lane LOS	B			A		
Approach Delay (s)	10.4	0.0		2.4		
Approach LOS	B					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			27.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	34	58	275	18	39	191
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	35	59	281	18	40	195
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						547
pX, platoon unblocked						
vC, conflicting volume	467	149			299	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	467	149			299	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	93			97	
cM capacity (veh/h)	508	870			1259	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	94	187	112	105	130	
Volume Left	35	0	0	40	0	
Volume Right	59	0	18	0	0	
cSH	689	1700	1700	1259	1700	
Volume to Capacity	0.14	0.11	0.07	0.03	0.08	
Queue Length 95th (ft)	12	0	0	2	0	
Control Delay (s)	11.0	0.0	0.0	3.2	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.0	0.0		1.4		
Approach LOS	B					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			30.0%	ICU Level of Service		A
Analysis Period (min)			15			
















APPENDIX D

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2016 PEAK PERIOD TRAFFIC
ANALYSIS WITHOUT PROJECT**

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St
















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	58	60	56	90	87	48	243	12	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.96			0.94			0.99				
Flt Protected		0.98			0.99			0.99				
Satd. Flow (prot)		3312			3301			3491				
Flt Permitted		0.77			0.83			0.99				
Satd. Flow (perm)		2615			2788			3491				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	91	64	66	62	99	96	53	267	13	0	0	0
RTOR Reduction (vph)	0	51	0	0	74	0	0	5	0	0	0	0
Lane Group Flow (vph)	0	170	0	0	183	0	0	328	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		5.4			5.4			8.1				
Effective Green, g (s)		5.4			5.4			8.1				
Actuated g/C Ratio		0.23			0.23			0.34				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		600			640			1203				
v/s Ratio Prot												
v/s Ratio Perm		0.07			0.07			0.09				
v/c Ratio		0.28			0.29			0.27				
Uniform Delay, d1		7.5			7.5			5.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.2			0.1				
Delay (s)		7.7			7.7			5.7				
Level of Service		A			A			A				
Approach Delay (s)		7.7			7.7			5.7			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			6.9									A
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			23.5							10.0		
Intersection Capacity Utilization			33.8%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	133	123	50	48	92	21	368	40	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.96			0.93			0.99				
Flt Protected		0.98			0.99			1.00				
Satd. Flow (prot)		3319			3239			3481				
Flt Permitted		0.78			0.78			1.00				
Satd. Flow (perm)		2633			2556			3481				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	169	139	128	52	50	96	22	383	42	0	0	0
RTOR Reduction (vph)	0	85	0	0	64	0	0	14	0	0	0	0
Lane Group Flow (vph)	0	351	0	0	134	0	0	433	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		9.7			9.7			9.5				
Effective Green, g (s)		9.7			9.7			9.5				
Actuated g/C Ratio		0.33			0.33			0.33				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		874			849			1132				
v/s Ratio Prot												
v/s Ratio Perm		c0.13			0.05			0.12				
v/c Ratio		0.40			0.16			0.38				
Uniform Delay, d1		7.5			6.9			7.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.1			0.2				
Delay (s)		7.8			7.0			7.8				
Level of Service		A			A			A				
Approach Delay (s)		7.8			7.0			7.8			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.7			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.39										
Actuated Cycle Length (s)		29.2			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		42.6%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	47	16	17	172	20	11	45	13	8	30	55
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	8	59	20	22	218	25	14	57	16	10	38	70
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	87	265	87	118								
Volume Left (vph)	8	22	14	10								
Volume Right (vph)	20	25	16	70								
Hadj (s)	-0.09	-0.01	-0.05	-0.30								
Departure Headway (s)	4.6	4.5	4.8	4.5								
Degree Utilization, x	0.11	0.33	0.12	0.15								
Capacity (veh/h)	721	762	684	726								
Control Delay (s)	8.2	9.7	8.5	8.3								
Approach Delay (s)	8.2	9.7	8.5	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.0								
Level of Service				A								
Intersection Capacity Utilization				27.4%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	156	13	24	133	10	22	32	23	27	78	26
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	166	14	26	141	11	23	34	24	29	83	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	195	178	82	139								
Volume Left (vph)	15	26	23	29								
Volume Right (vph)	14	11	24	28								
Hadj (s)	0.01	0.03	-0.09	-0.04								
Departure Headway (s)	4.7	4.7	4.9	4.9								
Degree Utilization, x	0.25	0.23	0.11	0.19								
Capacity (veh/h)	720	715	667	680								
Control Delay (s)	9.3	9.2	8.5	9.0								
Approach Delay (s)	9.3	9.2	8.5	9.0								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.1								
Level of Service				A								
Intersection Capacity Utilization				29.8%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	25	7	13	38	27	18	55	28	38	50	21
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	13	30	9	16	46	33	22	67	34	46	61	26
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	52	95	123	133								
Volume Left (vph)	13	16	22	46								
Volume Right (vph)	9	33	34	26								
Hadj (s)	-0.01	-0.14	-0.10	-0.01								
Departure Headway (s)	4.6	4.4	4.3	4.4								
Degree Utilization, x	0.07	0.12	0.15	0.16								
Capacity (veh/h)	727	762	799	783								
Control Delay (s)	7.9	8.0	8.0	8.2								
Approach Delay (s)	7.9	8.0	8.0	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.1								
Level of Service				A								
Intersection Capacity Utilization				22.7%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St










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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	25	7	9	50	19	11	38	22	29	110	22
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	27	7	10	53	20	12	40	23	31	117	23
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	49	83	76	171								
Volume Left (vph)	15	10	12	31								
Volume Right (vph)	7	20	23	23								
Hadj (s)	0.00	-0.09	-0.12	-0.01								
Departure Headway (s)	4.6	4.4	4.3	4.3								
Degree Utilization, x	0.06	0.10	0.09	0.20								
Capacity (veh/h)	733	759	802	805								
Control Delay (s)	7.9	7.9	7.7	8.4								
Approach Delay (s)	7.9	7.9	7.7	8.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.1								
Level of Service				A								
Intersection Capacity Utilization				24.2%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014




						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	20	62	314	17	20	50
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	65	327	18	21	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						623
pX, platoon unblocked						
vC, conflicting volume	404	172			345	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	404	172			345	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	92			98	
cM capacity (veh/h)	565	841			1211	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	85	218	127	38	35	
Volume Left	21	0	0	21	0	
Volume Right	65	0	18	0	0	
cSH	752	1700	1700	1211	1700	
Volume to Capacity	0.11	0.13	0.07	0.02	0.02	
Queue Length 95th (ft)	10	0	0	1	0	
Control Delay (s)	10.4	0.0	0.0	4.4	0.0	
Lane LOS	B			A		
Approach Delay (s)	10.4	0.0		2.3		
Approach LOS	B					
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			27.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	35	59	280	18	40	194
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	36	60	286	18	41	198
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						547
pX, platoon unblocked						
vC, conflicting volume	476	152			304	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	476	152			304	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	93			97	
cM capacity (veh/h)	501	867			1254	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	96	190	114	107	132	
Volume Left	36	0	0	41	0	
Volume Right	60	0	18	0	0	
cSH	682	1700	1700	1254	1700	
Volume to Capacity	0.14	0.11	0.07	0.03	0.08	
Queue Length 95th (ft)	12	0	0	3	0	
Control Delay (s)	11.1	0.0	0.0	3.2	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.1	0.0		1.4		
Approach LOS	B					
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			30.4%		ICU Level of Service	A
Analysis Period (min)			15			
















APPENDIX E

CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2016 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St
















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	61	73	56	101	107	48	277	14	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.95			0.94			0.99				
Flt Protected		0.98			0.99			0.99				
Satd. Flow (prot)		3298			3289			3493				
Flt Permitted		0.77			0.84			0.99				
Satd. Flow (perm)		2578			2798			3493				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	91	67	80	62	111	118	53	304	15	0	0	0
RTOR Reduction (vph)	0	62	0	0	91	0	0	6	0	0	0	0
Lane Group Flow (vph)	0	176	0	0	200	0	0	366	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		5.4			5.4			8.5				
Effective Green, g (s)		5.4			5.4			8.5				
Actuated g/C Ratio		0.23			0.23			0.36				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		582			632			1242				
v/s Ratio Prot												
v/s Ratio Perm		0.07			0.07			0.10				
v/c Ratio		0.30			0.32			0.29				
Uniform Delay, d1		7.7			7.7			5.5				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.3			0.1				
Delay (s)		8.0			8.0			5.7				
Level of Service		A			A			A				
Approach Delay (s)		8.0			8.0			5.7			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay			7.0									
HCM 2000 Volume to Capacity ratio			0.30									
Actuated Cycle Length (s)			23.9									
Intersection Capacity Utilization			36.3%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	149	151	50	54	104	21	391	50	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.95			0.93			0.98				
Flt Protected		0.98			0.99			1.00				
Satd. Flow (prot)		3308			3235			3474				
Flt Permitted		0.78			0.78			1.00				
Satd. Flow (perm)		2632			2558			3474				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	169	155	157	52	56	108	22	407	52	0	0	0
RTOR Reduction (vph)	0	104	0	0	71	0	0	17	0	0	0	0
Lane Group Flow (vph)	0	377	0	0	145	0	0	464	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		10.3			10.3			10.1				
Effective Green, g (s)		10.3			10.3			10.1				
Actuated g/C Ratio		0.34			0.34			0.33				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		891			866			1154				
v/s Ratio Prot												
v/s Ratio Perm		0.14			0.06			0.13				
v/c Ratio		0.42			0.17			0.40				
Uniform Delay, d1		7.8			7.0			7.8				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.1			0.2				
Delay (s)		8.1			7.1			8.1				
Level of Service		A			A			A				
Approach Delay (s)		8.1			7.1			8.1			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.9										
HCM 2000 Volume to Capacity ratio		0.41										
Actuated Cycle Length (s)		30.4							10.0			
Intersection Capacity Utilization		45.5%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	47	22	17	172	20	13	45	13	8	33	56
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	8	59	28	22	218	25	16	57	16	10	42	71
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	95	265	90	123								
Volume Left (vph)	8	22	16	10								
Volume Right (vph)	28	25	16	71								
Hadj (s)	-0.13	-0.01	-0.04	-0.30								
Departure Headway (s)	4.6	4.5	4.9	4.6								
Degree Utilization, x	0.12	0.33	0.12	0.16								
Capacity (veh/h)	722	755	678	721								
Control Delay (s)	8.3	9.8	8.5	8.4								
Approach Delay (s)	8.3	9.8	8.5	8.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.0								
Level of Service				A								
Intersection Capacity Utilization				28.3%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	156	16	24	133	10	32	32	23	27	85	30
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	166	17	26	141	11	34	34	24	29	90	32
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	198	178	93	151								
Volume Left (vph)	15	26	34	29								
Volume Right (vph)	17	11	24	32								
Hadj (s)	0.00	0.03	-0.05	-0.05								
Departure Headway (s)	4.8	4.8	5.0	4.9								
Degree Utilization, x	0.26	0.24	0.13	0.21								
Capacity (veh/h)	709	702	657	676								
Control Delay (s)	9.4	9.3	8.7	9.2								
Approach Delay (s)	9.4	9.3	8.7	9.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.2								
Level of Service				A								
Intersection Capacity Utilization				30.0%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	25	16	13	38	27	26	57	28	38	56	24
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Hourly flow rate (vph)	13	30	20	16	46	33	32	70	34	46	68	29
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	63	95	135	144								
Volume Left (vph)	13	16	32	46								
Volume Right (vph)	20	33	34	29								
Hadj (s)	-0.11	-0.14	-0.07	-0.02								
Departure Headway (s)	4.5	4.5	4.4	4.4								
Degree Utilization, x	0.08	0.12	0.16	0.18								
Capacity (veh/h)	730	746	786	776								
Control Delay (s)	7.9	8.1	8.2	8.3								
Approach Delay (s)	7.9	8.1	8.2	8.3								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.2								
Level of Service				A								
Intersection Capacity Utilization				22.0%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St

2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	25	13	9	50	19	29	48	22	29	113	29
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	27	14	10	53	20	31	51	23	31	120	31
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	55	83	105	182								
Volume Left (vph)	15	10	31	31								
Volume Right (vph)	14	20	23	31								
Hadj (s)	-0.06	-0.09	-0.04	-0.03								
Departure Headway (s)	4.6	4.5	4.4	4.3								
Degree Utilization, x	0.07	0.10	0.13	0.22								
Capacity (veh/h)	723	736	782	796								
Control Delay (s)	7.9	8.1	8.0	8.5								
Approach Delay (s)	7.9	8.1	8.0	8.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.2								
Level of Service				A								
Intersection Capacity Utilization				22.9%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014












Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	38	96	316	25	33	50
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	40	100	329	26	34	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						623
pX, platoon unblocked						
vC, conflicting volume	437	178			355	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	437	178			355	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	88			97	
cM capacity (veh/h)	532	835			1200	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	140	219	136	52	35	
Volume Left	40	0	0	34	0	
Volume Right	100	0	26	0	0	
cSH	719	1700	1700	1200	1700	
Volume to Capacity	0.19	0.13	0.08	0.03	0.02	
Queue Length 95th (ft)	18	0	0	2	0	
Control Delay (s)	11.2	0.0	0.0	5.5	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.2	0.0		3.3		
Approach LOS	B					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			30.9%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	48	82	290	36	68	194
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	49	84	296	37	69	198
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						547
pX, platoon unblocked						
vC, conflicting volume	552	166			333	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	552	166			333	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	90			94	
cM capacity (veh/h)	437	849			1223	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	133	197	135	135	132	
Volume Left	49	0	0	69	0	
Volume Right	84	0	37	0	0	
cSH	630	1700	1700	1223	1700	
Volume to Capacity	0.21	0.12	0.08	0.06	0.08	
Queue Length 95th (ft)	20	0	0	5	0	
Control Delay (s)	12.2	0.0	0.0	4.4	0.0	
Lane LOS	B			A		
Approach Delay (s)	12.2	0.0		2.2		
Approach LOS	B					
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			34.2%	ICU Level of Service		A
Analysis Period (min)			15			
















APPENDIX F

**CAPACITY ANALYSIS CALCULATIONS
PROJECTED YEAR 2016 PEAK PERIOD TRAFFIC
ANALYSIS WITH PROJECT WITH ALTERNATE LAYOUT**

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St
















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	83	71	63	56	107	119	48	265	20	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Flt		0.96			0.94			0.99				
Flt Protected		0.98			0.99			0.99				
Satd. Flow (prot)		3322			3283			3482				
Flt Permitted		0.75			0.84			0.99				
Satd. Flow (perm)		2545			2788			3482				
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	91	78	69	62	118	131	53	291	22	0	0	0
RTOR Reduction (vph)	0	49	0	0	93	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	189	0	0	218	0	0	357	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		7.4			7.4			8.1				
Effective Green, g (s)		7.4			7.4			8.1				
Actuated g/C Ratio		0.29			0.29			0.32				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		738			809			1106				
v/s Ratio Prot												
v/s Ratio Perm		0.07			0.08			0.10				
v/c Ratio		0.26			0.27			0.32				
Uniform Delay, d1		6.9			7.0			6.6				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.2			0.2			0.2				
Delay (s)		7.1			7.1			6.8				
Level of Service		A			A			A				
Approach Delay (s)		7.1			7.1			6.8			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.0			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.30										
Actuated Cycle Length (s)		25.5			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		36.7%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

1: South St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	162	138	50	62	117	21	378	58	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0			5.0				
Lane Util. Factor		0.95			0.95			0.95				
Frt		0.96			0.92			0.98				
Flt Protected		0.98			0.99			1.00				
Satd. Flow (prot)		3322			3233			3464				
Flt Permitted		0.77			0.79			1.00				
Satd. Flow (perm)		2618			2591			3464				
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	169	169	144	52	65	122	22	394	60	0	0	0
RTOR Reduction (vph)	0	94	0	0	80	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	388	0	0	159	0	0	455	0	0	0	0
Turn Type	Perm	NA		Perm	NA		Perm	NA				
Protected Phases		6			2			4				
Permitted Phases	6			2			4					
Actuated Green, G (s)		10.5			10.5			10.1				
Effective Green, g (s)		10.5			10.5			10.1				
Actuated g/C Ratio		0.34			0.34			0.33				
Clearance Time (s)		5.0			5.0			5.0				
Vehicle Extension (s)		3.0			3.0			3.0				
Lane Grp Cap (vph)		898			889			1143				
v/s Ratio Prot												
v/s Ratio Perm		0.15			0.06			0.13				
v/c Ratio		0.43			0.18			0.40				
Uniform Delay, d1		7.8			7.0			7.9				
Progression Factor		1.00			1.00			1.00				
Incremental Delay, d2		0.3			0.1			0.2				
Delay (s)		8.1			7.1			8.1				
Level of Service		A			A			A				
Approach Delay (s)		8.1			7.1			8.1			0.0	
Approach LOS		A			A			A			A	
Intersection Summary												
HCM 2000 Control Delay		7.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.42										
Actuated Cycle Length (s)		30.6			Sum of lost time (s)			10.0				
Intersection Capacity Utilization		45.9%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	6	47	25	17	172	20	19	45	13	8	31	58
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	8	59	32	22	218	25	24	57	16	10	39	73
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	99	265	97	123								
Volume Left (vph)	8	22	24	10								
Volume Right (vph)	32	25	16	73								
Hadj (s)	-0.14	-0.01	-0.02	-0.31								
Departure Headway (s)	4.6	4.6	4.9	4.6								
Degree Utilization, x	0.13	0.33	0.13	0.16								
Capacity (veh/h)	720	750	673	718								
Control Delay (s)	8.3	9.8	8.7	8.4								
Approach Delay (s)	8.3	9.8	8.7	8.4								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.1								
Level of Service				A								
Intersection Capacity Utilization				30.4%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

2: Keawe St & Pohukaina St

















2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	156	20	24	133	10	40	32	23	27	82	33
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	166	21	26	141	11	43	34	24	29	87	35
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	202	178	101	151								
Volume Left (vph)	15	26	43	29								
Volume Right (vph)	21	11	24	35								
Hadj (s)	-0.01	0.03	-0.03	-0.07								
Departure Headway (s)	4.8	4.8	5.0	4.9								
Degree Utilization, x	0.27	0.24	0.14	0.21								
Capacity (veh/h)	706	696	653	671								
Control Delay (s)	9.5	9.4	8.9	9.2								
Approach Delay (s)	9.5	9.4	8.9	9.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				9.3								
Level of Service				A								
Intersection Capacity Utilization				31.7%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St

















2/21/2014

																				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR								
Lane Configurations																				
Sign Control		Stop			Stop			Stop			Stop									
Volume (vph)	11	25	13	13	38	27	20	63	28	38	59	22								
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82								
Hourly flow rate (vph)	13	30	16	16	46	33	24	77	34	46	72	27								
Direction, Lane #	EB 1	WB 1	NB 1	SB 1																
Volume Total (vph)	60	95	135	145																
Volume Left (vph)	13	16	24	46																
Volume Right (vph)	16	33	34	27																
Hadj (s)	-0.08	-0.14	-0.08	-0.01																
Departure Headway (s)	4.6	4.5	4.3	4.4																
Degree Utilization, x	0.08	0.12	0.16	0.18																
Capacity (veh/h)	725	746	789	776																
Control Delay (s)	8.0	8.1	8.2	8.4																
Approach Delay (s)	8.0	8.1	8.2	8.4																
Approach LOS	A	A	A	A																
Intersection Summary																				
Delay			8.2																	
Level of Service			A																	
Intersection Capacity Utilization			23.2%	ICU Level of Service	A															
Analysis Period (min)			15																	

HCM Unsignalized Intersection Capacity Analysis

3: Keawe St & Auahi St










2/21/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	14	25	10	9	50	19	21	56	22	29	117	26
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	27	11	10	53	20	22	60	23	31	124	28
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	52	83	105	183								
Volume Left (vph)	15	10	22	31								
Volume Right (vph)	11	20	23	28								
Hadj (s)	-0.03	-0.09	-0.06	-0.02								
Departure Headway (s)	4.6	4.5	4.4	4.3								
Degree Utilization, x	0.07	0.10	0.13	0.22								
Capacity (veh/h)	718	737	786	796								
Control Delay (s)	8.0	8.1	8.0	8.5								
Approach Delay (s)	8.0	8.1	8.0	8.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay				8.2								
Level of Service				A								
Intersection Capacity Utilization				23.7%	ICU Level of Service	A						
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St










2/21/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	32	84	322	19	23	50
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	33	88	335	20	24	52
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						623
pX, platoon unblocked						
vC, conflicting volume	419	178			355	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419	178			355	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	90			98	
cM capacity (veh/h)	551	835			1200	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	121	224	132	41	35	
Volume Left	33	0	0	24	0	
Volume Right	88	0	20	0	0	
cSH	731	1700	1700	1200	1700	
Volume to Capacity	0.17	0.13	0.08	0.02	0.02	
Queue Length 95th (ft)	15	0	0	2	0	
Control Delay (s)	10.9	0.0	0.0	4.7	0.0	
Lane LOS	B			A		
Approach Delay (s)	10.9	0.0		2.6		
Approach LOS	B					
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			29.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

4: South St & Auahi St

2/21/2014

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	40	69	298	28	55	194
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	41	70	304	29	56	198
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)						547
pX, platoon unblocked						
vC, conflicting volume	530	166			333	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	530	166			333	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	92			95	
cM capacity (veh/h)	457	849			1223	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	
Volume Total	111	203	130	122	132	
Volume Left	41	0	0	56	0	
Volume Right	70	0	29	0	0	
cSH	646	1700	1700	1223	1700	
Volume to Capacity	0.17	0.12	0.08	0.05	0.08	
Queue Length 95th (ft)	15	0	0	4	0	
Control Delay (s)	11.7	0.0	0.0	3.9	0.0	
Lane LOS	B			A		
Approach Delay (s)	11.7	0.0		1.9		
Approach LOS	B					
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		32.5%		ICU Level of Service		A
Analysis Period (min)		15				