APPENDIX N

Traffic Impact Analysis Report
Hawaiian Memorial Park
Cemetery Expansion – January 2019
Prepared by: Austin, Tsutsumi & Associates, Inc.

TRAFFIC IMPACT ANALYSIS REPORT
HAWAIIAN MEMORIAL PARK CEMETERY EXPANSION
KANEOHE, OAHU, HAWAII

January 28, 2019

Prepared for:

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CEMETERY EXPANSION

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A. TRAFFIC COUNT DATA

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C. LEVEL OF SERVICE CALCULATIONS

AUSTIN, TSUTSUMI & ASSOCIATES, INC. CIVIL ENGINEERS • SURVEYORS
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TRAFFIC IMPACT ANALYSIS REPORT
HAWAIIAN MEMORIAL PARK CEMETERY EXPANSION
Kaneohe, Oahu, Hawaii

1. INTRODUCTION

This report documents the findings of a traffic study conducted by Austin, Tsutsumi & Associates, Inc. (ATA) to evaluate the traffic impacts for the expansion of the Hawaiian Memorial Park Cemetery Expansion in Kaneohe, Oahu, Hawaii (hereinafter referred to as the "Project").

1.1 Location

The existing Hawaiian Memorial Park (HMP) is located in Kaneohe on the island of Oahu on parcels of land more specifically identified as TMKs: (1)4-5-34:013, (1)4-5-35:008, and a portion of (1)4-5-33:001. Parcel 13 and 8 are adjacent, but are separated from Parcel 1 (portion of the parcel is known as the Ocean View Garden) by the Hawaii State Veterans Cemetery (4-5-033:002). The proposed expansion of the Project is located within Parcel 1 and is adjacent to the Ocean View Garden. The project site is bordered by undeveloped land to the east, Kamehameha Highway to the west, Interstate H-3 Freeway and Kapaa Quarry to the south, and residential units to the north. See Figure 1.1 for the Project location.

1.2 Project Description

Hawaiian Memorial Life Plan, Ltd. owns and manages the Hawaiian Memorial Park (HMP) that offers a variety of internment options. Due to the growing aging population on Oahu and the demand for ground internment and inurnment spaces, only about six (6) percent of all the individual plots are currently available for families. The existing HMP comprises of approximately 80 acres that includes cemetery space and a funeral hall. The Project is approximately 53.45 acres in size, and is a portion of a larger 164.4 acre parcel. The Project entails approximately 28.2 acres of cemetery use, 14.5 acres of cultural preserve, 7.75 acres of open space, and 3 acres of open roadway. The vehicular accesses to the Project will occur at the two (2) existing driveways along Kamehameha Highway, at the intersections of Mahinui Road and Halekou Road. It is our understanding that the TIAR will be included as an attachment to an Environmental Impact Statement (EIS) prepared for this Project. See Figure 1.2 for the proposed Project site plan.

1.3 Study Methodology

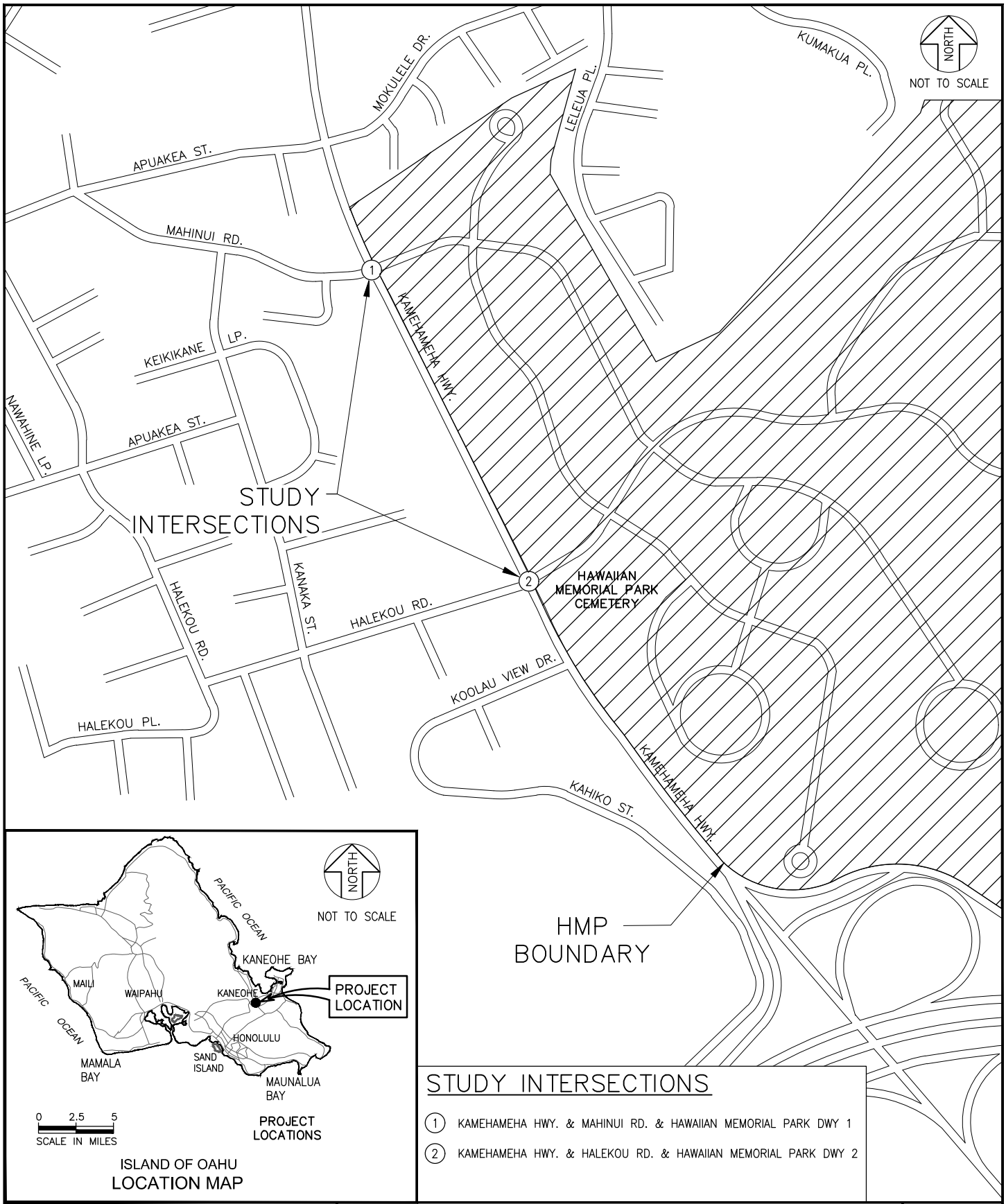
This study will address the following:

1. Assess existing traffic operating conditions during one (1) memorial service, and the weekday AM and PM peak hours of traffic within the study area.
2. Traffic projections for Base Year 2040 (without the Project).
3. Estimate the vehicular trips that will be generated by the Project.
4. Traffic projections for the Project for Future Year 2040 (with Project).
5. Recommendations for roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by the Project.

1.4 Analysis Methodology

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM) 6th Edition, includes methods for calculating volume to capacity ratios, delays, and corresponding LOS that were utilized in this study. See Appendix B for Level of Service Criteria.

Analyses for the study intersections were performed using the traffic analysis software Synchro, which is able to prepare reports based on the methodologies described in the HCM. These reports contain control delay results as based on intersection lane geometry, signal timing, and hourly traffic volumes. Based on the vehicular delay at each intersection, a LOS is assigned to each approach and intersection movement as a qualitative measure of performance. These results, as confirmed or refined by field observations, constitute the technical analysis that will form the basis of the recommendations outlined in this report.



HAWAIIAN MEMORIAL PARK
CEMETERY EXPANSION TIAR

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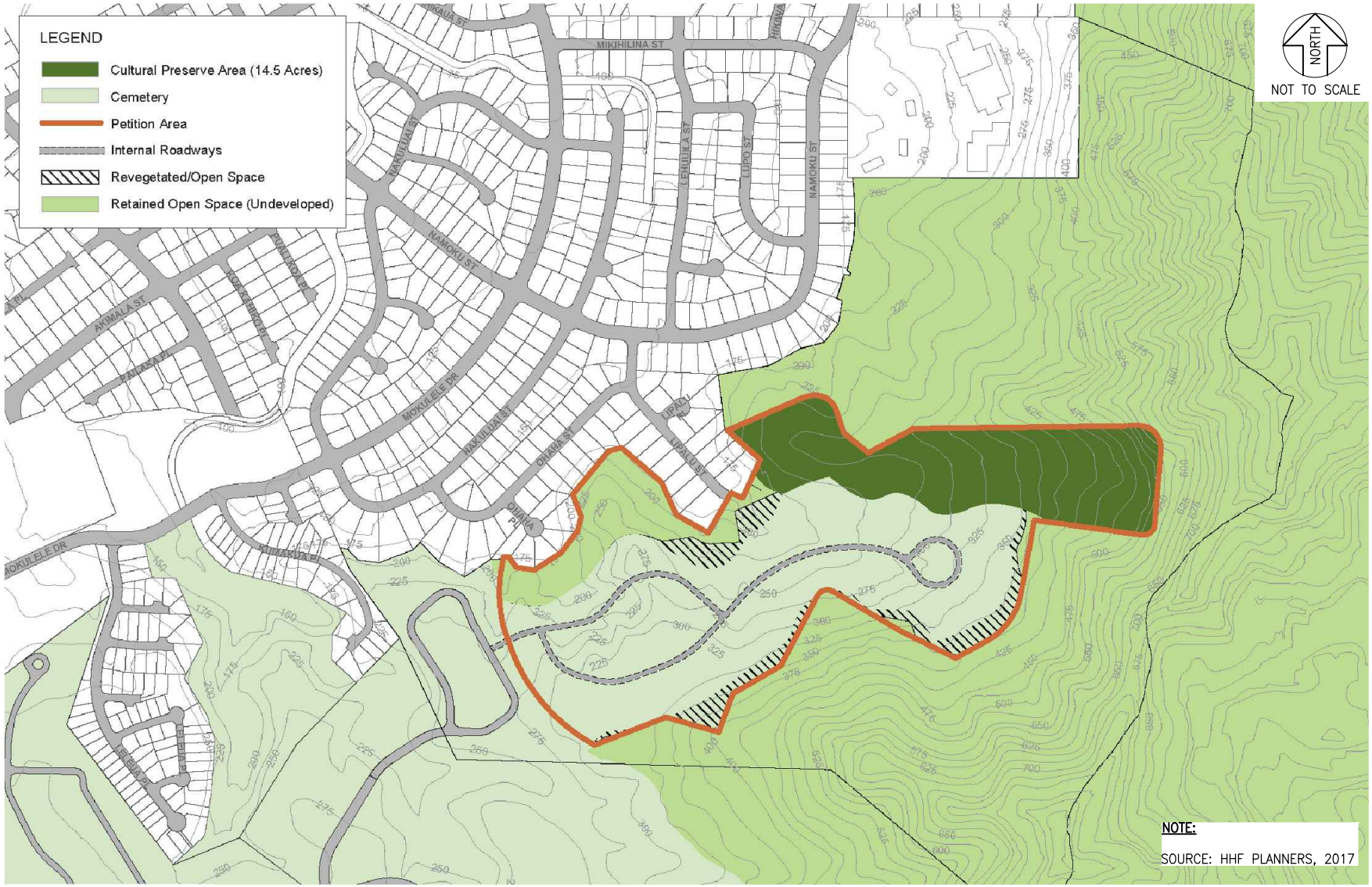
LOCATION MAP

FIGURE
1.1



HAWAIIAN MEMORIAL PARK CEMETERY EXPANSION TIAR

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FIGURE 1.2

SITE PLAN

2. EXISTING CONDITIONS

2.1 Roadway System

The following are brief descriptions of the roadways in the vicinity of the Project:

Kamehameha Highway

In the vicinity of Halekou Road and Mahinui Road, Kamehameha Highway is generally a north-south, four-lane, two-way, divided arterial roadway. The posted speed limit within the vicinity is 35 miles per hour (mph).

Halekou Road

Halekou Road in the vicinity of Kamehameha Highway is an east-west, two-way, two-lane, undivided local roadway forming the west leg of the intersection. Halekou Road provides access to a residential community situated to the west of Kamehameha Highway. For the purposes of this report, the entrance to the Hawaiian Memorial Park Cemetery and Veterans Cemetery to the east of the Kamehameha Highway/Halekou Road intersection, which is currently observed as the main entrance, will be referred to as Halekou Road. This roadway has a posted speed limit of 25 mph.

Mahinui Road

Mahinui Road in the vicinity of Kamehameha Highway is an east-west, two-way, two-lane, undivided local roadway. Mahinui Road provides access to a residential community situated to the west and cemetary access to the east of Kamehameha Highway. For the purposes of this report, the entrance to the Hawaiian Memorial Park Cemetery and Hawaii State Veterans Cemetery to the east of the Kamehameha Highway/Mahinui Road intersection will be referred to as Mahinui Road. This roadway has a posted speed limit of 25 mph.

Internal Roads within Hawaiian Memorial Park

Existing roadways within Hawaiian Memorial Park are private internal roadways that provide access throughout Hawaiian Memorial Park Cemetery and Hawaii State Veterans Cemetery. Two (2) of the internal roadways currently connect to the Mahinui Road and Halekou Road intersections. Both intersections are used to enter and exit Hawaiian Memorial Park; however, the Halekou Road intersection was observed to be the main entrance. No posted speed limit signs were observed within the internal roadways.

2.2 Sustainable Transportation

2.2.1 Complete Streets

While transportation planning has traditionally focused on automobile travel, recent “Complete Streets” policies also recognize the numerous benefits of encouraging the use of alternative modes of transportation. “Complete Streets” policies encourage the provision of equitable, accessible, and safe transportation for all modes.

Hawaii State Senate Bill 718 (2009) required that the Hawaii Department of Transportation (HDOT) and the County transportation departments:

"…adopt a complete streets policy that seeks to reasonably accommodate convenient access and mobility for all users of the public highways within their respective jurisdictions…"

2.2.2 Pedestrian Accessibility

Within the Project vicinity, sidewalks are provided on the west side of the roadway on Kamehameha Highway from Koolau View Drive to Kaneohe Bay Drive and on the east side from Kaneohe Elementary School passed Kaneohe Bay Drive.

2.2.3 Bicycle Accessibility

Within the Project vicinity, bicycle lanes are currently not provided on both sides of Kamehameha Highway.

2.2.4 Public Transit

Oahu Transit Services (OTS) operates TheBus, which currently operates a fleet of 519 buses servicing most populated areas of the island. The cost of service for an adult is $2.75 for each 1-way ride, $5.50 for a 1-day pass, $70 for a monthly pass, and $770 for an annual pass[1]. Discount rates are available for seniors, students, and military.

Within the Project vicinity, access to TheBus is provided along Kamehameha Highway. Routes that service these bus stops are routes 55, 65, and 77.

See Figure 2.1 for pedestrian volumes.

2.3 Existing Traffic Volumes

Manual turning movement traffic counts and field observations were conducted at the following study intersections on Tuesday, September 26 and Saturday September 30, 2017.

- Kamehameha Highway/Mahinui Road (Unsignalized)
- Kamehameha Highway/Halekou Road (Unsignalized)

Based on the traffic count data, the weekday AM, weekday PM, and Saturday peak hours of traffic were determined to be from 7:15 AM to 8:15 AM, 4:00 PM to 5:00 PM, and 11:45 AM to 12:45 PM, respectively. The traffic count data is provided in Appendix A.

2.4 Existing Observations and Analysis

2.4.1 Regional Analysis

The Project is located in the general Kaneohe region of Oahu. Kaneohe serves as the gateway to Oahu's north shore, while also housing residential, institutional, commercial, and industrial land uses. Likelike Highway, Kahekili Highway, Kaneohe Bay Drive, and Kamehameha Highway serve as the primary arterial roads through the area.

[1] Based on 2018 TheBus information.

In the vicinity of the Project, Kahekili Highway and Kamehameha Highway combine to form the regional north-south corridor. During the AM peak hour of traffic, southbound traffic heading towards the primary urban center of Honolulu is heavier than northbound traffic, whereas during the PM peak hour of traffic, northbound traffic is heavier due to commuters returning home from work. The Project is located to the east of Kamehameha Highway.

2.4.2 Intersection Observations and Analysis

2.4.2.1 AM and PM Peak Hour

At the study intersections, the westbound approaches, exiting the cemetery, are currently striped as a wide shared left/through/right lane, but were observed to operate as a shared left/through with a separate right turn lane. Vehicles making left-turns from the minor east-west approaches are able to use the space created by the wide median to turn onto or off of Kamehameha Highway in two (2) stages. During the AM and PM peak hour of traffic, both minor street left-turn movements onto Kamehameha Highway were executed during gaps in major street traffic, which are suspected to result from the upstream and downstream traffic signal minor movements phase is occurring; no significant queueing was observed at the study intersections.

Based on HMP's memorial service schedule, a total of three (3) memorial services were scheduled during the time of the traffic counts, which occurred at 11:00 AM, 1:00 PM and 2:00 PM. During field observations, trips generated by the memorial services were minimal as services were not observed to be busy. The majority of the vehicles entering HMP were observed to park along both sides of the roadway within the property and very few vehicles were parked at the parking lot across of the funeral hall. Generally, trips generated by HMP were minimal and was observed to have light internal circulation with no significant queuing within the property and at the study intersections.

Southbound U-turns are allowed at Kahiko Street approximately 975 feet to the south and northbound U-turns are allowed at Mahinui Road approximately 1,250 feet to the north. In addition, Mahinui Road and Mokulele Drive are connected via internal local roads west of Kamehameha Highway.

In the vicinity of the Project, bus stops are located just north of the intersection of Kamehameha Highway/Halekou Road, with one in each direction. The crosswalk at the Kamehameha Highway/Halekou Road is the closest crossing to those bus stops. In addition to providing a vehicular refuge, the wide median also provides a pedestrian refuge when crossing Kamehameha Highway. Although, those two (2) bus stops were located near the intersection, very few pedestrians were observed crossing the intersection.

2.4.2.2 Saturday MD Peak Hour

Generally, traffic within the Project vicinity was lighter compared to the weekday peak hours of traffic. Left turn movements from the minor streets were easier to execute as longer gaps were observed along Kamehameha Highway. No significant queuing was observed at the study intersections.

Incoming vehicles to HMP were heavier than the weekday peak hours due to memorial services and visitation, but is likely to vary. During Saturday field observations, a total of three (3) memorial services occurred and were held at 10:00 AM, 11:00 AM and 1:00 PM. The majority of the trips

attending the memorial service at the funeral hall was observed to park at the internal intersection near the building, along both sides of each leg, and at the parking lot across of the funeral hall, which occupied a little more than half of the total stalls. The largest funeral service was at 10:00 AM and was observed to have approximately 30-50 people in the funeral hall. The memorial service lasted approximately two (2) hours. Two (2) burial services were also observed. Trips attending the burial service parked near the burial site and occurred sporadically within a two (2) hour time frame. Internal circulation nearing the funeral service hall and near the burial sites operated smoothly as no significant queuing was observed within the property and at the study intersections.

2.4.2.3 Intersection Analysis

Kamehameha Highway & Mahinui Road – All movements at this unsignalized intersection currently operates at LOS D or better with the exception of the minor street movements, which operates at LOS E during the AM and PM peak hour of traffic.

Kamehameha Highway & Halekou Road – All movements at this unsignalized intersection currently operates at LOS D or better with the exception of the minor street movements, which operates at LOS E/F during all peak hours of traffic.

Figure 2.1 illustrates the existing lane configuration, existing traffic volumes, and LOS for each study intersection. Table 2.1 summarizes the existing LOS at the study intersections. LOS worksheets are provided in Appendix C.

LEGEND

##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

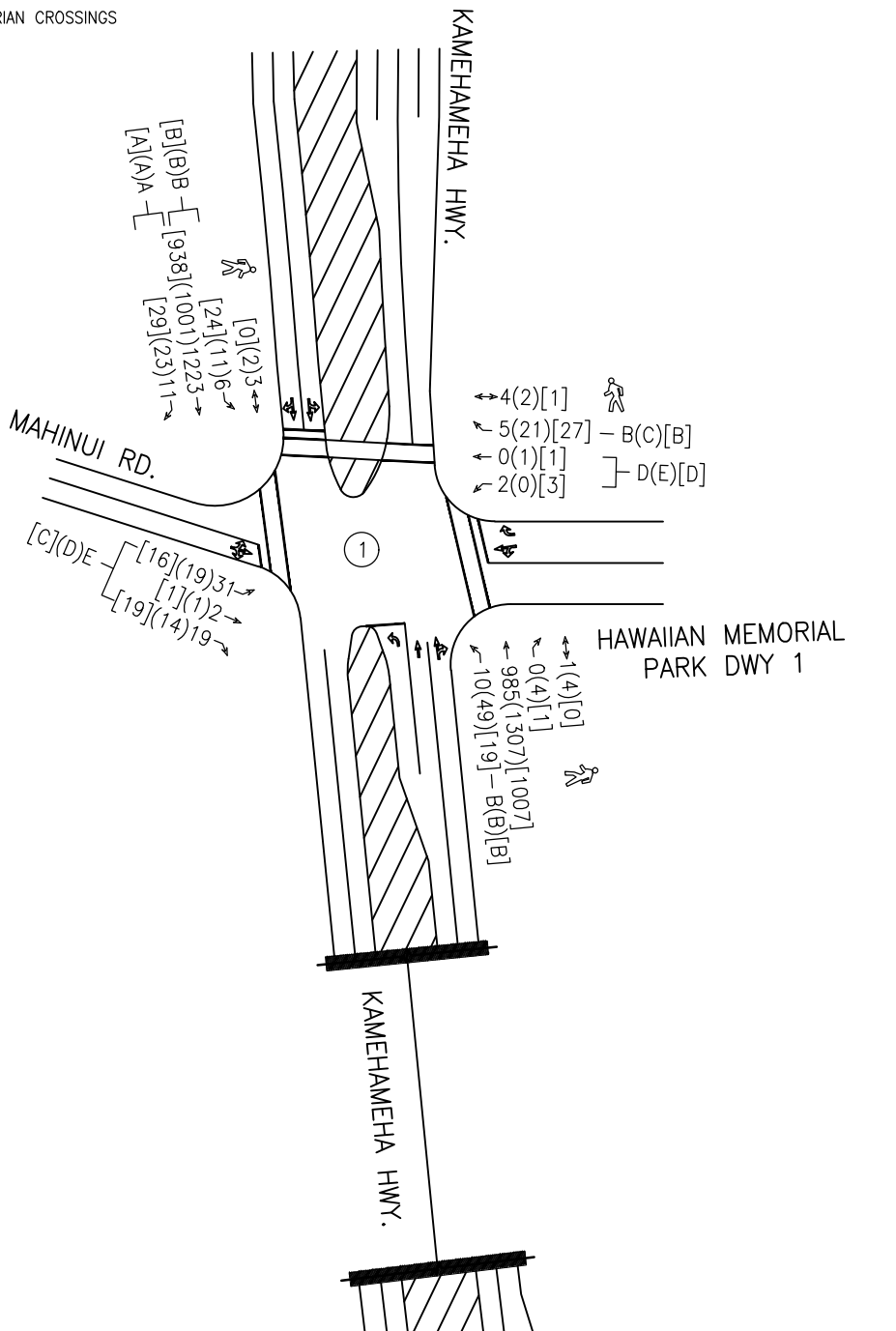
(X) – UNSIGNALIZED INTERSECTION Y

X(X)[X] – AM(PM)[WE] LOS

##(##)[##] – AM(PM)[WE) PEAK HOUR OF TRAFFIC, PEDESTRIAN CROSSINGS

NORTH

NOT TO SCALE



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DATE OF COUNTS:
SEPTEMBER 26 & 30, 2017

AM PEAK HOUR:
7:15 AM – 8:15 AM

PM PEAK HOUR:
4:00 PM – 5:00 PM

WE PEAK HOUR:
11:45 AM – 12:45 PM

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EXISTING LANE CONFIGURATION, LOS AND VOLUMES

FIGURE 2.1

Table 2.1: Existing 2017 Level of Service Summary

Intersection	Existing Conditions								
	AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Highway & Mahinui Street/Project Access 1									
NB LT	12.2	0.02	B	11.3	0.09	B	10.7	0.03	B
EB LT/TH/RT	39.6	0.36	E	31.8	0.22	D	23.2	0.17	C
WB LT/TH	30.2	0.02	D	45.0	0.01	E	31.3	0.03	D
WB RT	12.5	0.01	B	15.3	0.06	C	13.0	0.06	B
SB LT/TH	10.6	0.01	B	12.8	0.03	B	10.9	0.04	B
SB TH/RT	0.2	0.00	A	0.4	0.00	A	0.5	0.00	A
2: Kamehameha Highway & Halekou Road/Project Access 2									
NB LT	12.3	0.05	B	11.6	0.15	B	10.9	0.09	B
EB LT/TH/RT	65.7	0.79	F	31.1	0.33	D	22.8	0.23	C
WB LT/TH	36.7	0.05	E	74.0	0.28	F	51.2	0.40	F
WB RT	12.7	0.04	B	15.6	0.07	C	13.1	0.09	B
SB LT	10.8	0.06	B	13.1	0.04	B	11.0	0.05	B

3. BASE YEAR 2040 TRAFFIC CONDITIONS

The Year 2040 was selected to reflect the Project completion year, which pertains to the expansion of the Project. The Base Year 2040 scenario represents the traffic conditions within the study area without the Project. Traffic projections were formulated by applying a defacto growth rate to the existing 2017 traffic count volumes as well as trips generated by identified potential future developments in the vicinity of the Project.

3.1 Defacto Growth Rate

Projections for Base Year 2040 traffic were based upon the Oahu Regional Travel Demand Model (ORTDM) which forecasts growth for years between 2007 and 2035. The resulting annual growth rate along Kamehameha Highway was determined to be approximately 0.4 percent per year. This growth rate was applied on along Kamehameha Highway to represent regional traffic growth in the vicinity of the Project through Year 2040.

3.2 Background Developments

By year 2040, the Kaneohe area is anticipated to remain similar to existing conditions.

3.3 Base Year 2040 Analysis

3.3.1 Base Year 2040 Without Traffic Signal

All study intersections are forecast to operate with LOS similar to existing conditions, except for the eastbound movement at Halekou Road, which is anticipated to worsen and operate overcapacity at LOS F conditions. Intersection movements operating at LOS F and/or overcapacity conditions in existing conditions will continue to operate at LOS F and/or overcapacity conditions in the Base Year 2040 scenario.

The minor street movements will continue to experience delay and is forecast to operate at LOS E/F conditions during all peak hours of traffic due to relative high speeds and available sight distances along Kamehameha Highway.

Figure 3.1 illustrates the Base Year 2040 Without Traffic Signal forecast traffic volumes and LOS for the study intersection movements.

3.3.2 Roadway Improvements

A traffic signal study for the intersection of Kamehameha Highway/Halekou Road is currently underway by HDOT. As the study is still in progress and no outcome is recommended at this time, this report will analyze both scenarios, in which a traffic signal will be recommended or not.

3.3.3 Base Year 2040 With Traffic Signal

In the scenario that a traffic signal is warranted based on the findings of the HDOT study, the Kamehameha Highway/Halekou Road intersection is anticipated to operate at an overall LOS of C or better during all peak hour of traffic. In addition, all major through movements are anticipated to operate at LOS C or better and all other minor and turning movements will operate under-capacity at LOS E or better during all peak hours of traffic. A traffic signal at the intersection of Kamehameha Highway/Halekou Road is expected to create gaps in traffic for the minor street

movements at the intersection of Kamehameha Highway/Mahinui Road to execute left/through movements.

Figure 3.2 illustrates the Base Year 2040 With Traffic Signal forecast traffic volumes and LOS for the study intersection movements. Table 3.1 summarizes the Base Year 2040 LOS at the study intersections compared to existing conditions. LOS worksheets are provided in Appendix C.

LEGEND

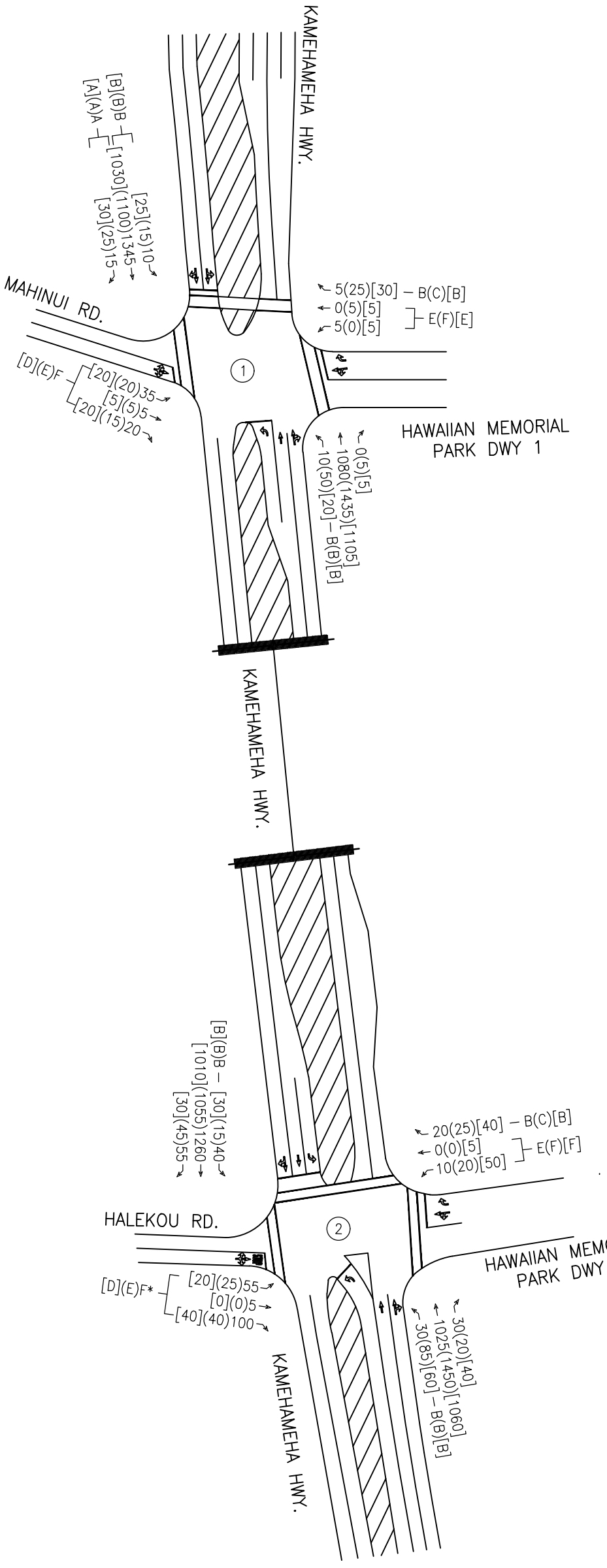
##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

(X) – UNSIGNALIZED INTERSECTION Y

X(X)[X] – AM(PM)[WE] LOS

NORTH

NOT TO SCALE



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BASE YEAR 2040 WITHOUT TRAFFIC SIGNAL LANE CONFIGURATION, LOS AND VOLUMES

FIGURE 3.1

LEGEND

##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

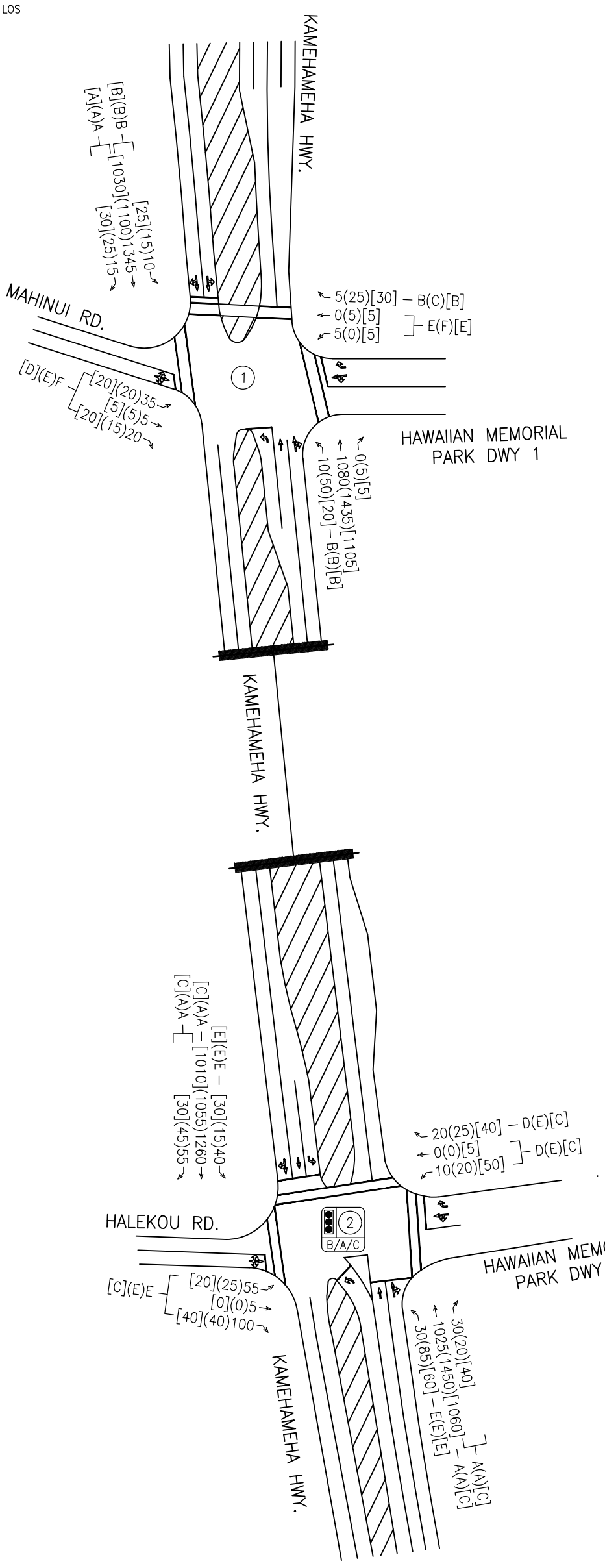
(X) – UNSIGNALIZED INTERSECTION Y

(Y) X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS

X(X)[X] – AM(PM)[WE] LOS

NORTH

NOT TO SCALE



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BASE YEAR 2040 WITH TRAFFIC SIGNAL LANE CONFIGURATION, LOS AND VOLUMES

FIGURE 3.2

Table 3.1: Base Year 2040 Level of Service Summary

Intersection	Base Year 2040 without Traffic Signal									Base Year 2040 with Traffic Signal								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Highway & Mahinui Street/Project Access 1																		
NB LT	13.2	0.02	B	12.0	0.10	B	11.2	0.04	B	13.2	0.02	B	12.0	0.10	B	11.2	0.04	B
EB LT/TH/RT	60.0	0.51	F	45.6	0.33	E	31.5	0.27	D	60.0	0.51	F	45.6	0.33	E	31.5	0.27	D
WB LT/TH	37.0	0.05	E	59.0	0.08	F	39.9	0.10	E	37.0	0.05	E	59.0	0.08	F	39.9	0.10	E
WB RT	13.2	0.01	B	16.6	0.08	C	13.8	0.07	B	13.2	0.01	B	16.6	0.08	C	13.8	0.07	B
SB LT/TH	11.2	0.02	B	14.0	0.04	B	11.6	0.05	B	11.2	0.02	B	14.0	0.04	B	11.6	0.05	B
SB TH/RT	0.6	0.00	A	0.8	0.00	A	0.7	0.00	A	0.6	0.00	A	0.8	0.00	A	0.7	0.00	A
2: Kamehameha Highway & Halekou Road/Project Access 2																		
NB LT	13.2	0.07	B	12.4	0.16	B	11.6	0.11	B	72.1	0.67	E	66.8	0.79	E	70.6	0.78	E
NB TH	-	-	-	-	-	-	-	-	-	5.7	0.41	A	4.4	0.53	A	20.6	0.59	C
NB TH/RT	-	-	-	-	-	-	-	-	-	5.7	0.41	A	4.4	0.53	A	20.5	0.59	C
EB LT/TH/RT	128.1	1.02	F*	38.2	0.40	E	26.7	0.28	D	56.4	0.60	E	59.4	0.27	E	31.8	0.05	C
WB LT/TH	47.2	0.11	E	102.8	0.38	F	77.2	0.57	F	50.0	0.06	D	56.7	0.17	E	30.5	0.12	C
WB RT	13.3	0.05	B	17.0	0.08	C	14.0	0.10	B	49.4	0.01	D	55.5	0.02	E	29.2	0.01	C
SB LT	11.5	0.07	B	14.2	0.04	B	11.6	0.06	B	76.3	0.76	E	71.5	0.52	E	72.1	0.67	E
SB TH	-	-	-	-	-	-	-	-	-	6.6	0.51	A	5.1	0.42	A	21.3	0.58	C
SB TH/RT	-	-	-	-	-	-	-	-	-	6.5	0.51	A	5.1	0.42	A	21.2	0.58	C
Overall	8.4	-	-	2.3	-	-	3.1	-	-	10.3	-	B	7.9	-	A	23.0	-	C

* Denotes overcapacity condition, v/c ≥ 1.0

4. FUTURE YEAR 2040 TRAFFIC CONDITIONS

The Future Year 2040 scenario represents the traffic conditions within the Project study area with the full buildout of the Project.

4.1 Background

The Project is approximately 53.45 acres in size, and is a portion of a larger 164.4 acre parcel adjacent to the Ocean View Garden. The Project entails 28.2 acres of cemetery use, 14.5 acres of cultural preserve, 7.75 acres of open space, and 3 acres of open roadway. The vehicular accesses to the Project will occur at the two (2) existing driveways along Kamehameha Highway, at the intersections of Mahinui Road and Halekou Road. The Project is expected to be completed by Year 2040.

4.2 Travel Demand Estimations

4.2.1 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 9th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables.

In the ITE trip generation handbook, one (1) study was used to analyze the trip generation for the cemetery land use. The ITE trip generation handbook states “Users are cautioned to use data with care because of the small sample size”; therefore, the trips generated for the Project was derived by the existing trip generation rates. Based on the existing trip generation rates, the cemetery component of the Project is forecast to generate approximately 25(27)[71] trips during the AM(PM)[Sat MD] peak hour of traffic.

See Tables 4.1 and 4.2 for Trip Generation formulae and projections for the Project.

Table 4.1: Trip Generation Rates for the Project

Land Use Type	Independent Variable	Weekday AM		Weekday PM		Saturday MD	
		Trip Rate	% Enter	Trip Rate	% Enter	Trip Rate	% Enter
Cemetery (Existing Trip Generation Rate)	Acre	0.90	54%	0.97	69%	2.50	43%

Table 4.2: Peak Hour Trips Generated by the Project

Land Use Type	Independent Variable	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday MD		
		Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)	Enter (vph)	Exit (vph)	Total (vph)
Cemetery (Existing Trip Generation Rate)	28.2 Acres	14	11	25	19	8	27	30	41	71

4.2.2 Trip Distribution

Trips generated by the Project were assigned throughout the study area based generally upon existing travel patterns. The traffic generated by the Project was added to the forecast Base Year 2040 traffic volumes within the vicinity of the Project to constitute the traffic volumes for the Future Year 2040 traffic conditions. Figure 4.1 illustrates the Project-generated trip distribution.

4.3 Future Year 2040 Analysis

4.3.1 Future Year 2040 Without Traffic Signal

Upon completion of the Project, all study intersections are forecast to operate with LOS similar to Base Year 2040 conditions. The eastbound and westbound movements are anticipated to operate similarly to continue operating at LOS E/F during all peak hours of traffic, expect for the Halekou Road eastbound movement, which is anticipated to continue to operate overcapacity at LOS F during the AM peak hour of traffic. Intersection movements operating at LOS F and/or overcapacity conditions in the Base Year 2040 conditions will continue to operate at LOS F and/or overcapacity conditions in the Future Year 2040 scenario.

Figure 4.2 illustrates the Future Year 2040 Without Traffic Signal forecast traffic volumes and LOS for the study intersection movements.

4.3.2 Roadway Improvements

As mentioned in Section 3.3.2, a traffic signal study for the intersection of Kamehameha Highway/Halekou Road is currently underway by HDOT. As the study is still in progress and no outcome is recommended at this time, this report will analyze both scenarios, in which a traffic signal will be recommended or not.

4.3.3 Future Year 2040 With Traffic Signal

In the scenario that a traffic signal is warranted at the intersection of Kamehameha Highway/Halekou Road, upon completion of the Project, the study intersection is anticipated to operate similarly to Base Year 2040 With Traffic Signal conditions, at LOS E or better during all peak hours of traffic. A traffic signal at the intersection of Kamehameha Highway/Halekou Road is expected to continue to create gaps in traffic for the minor street movements at the intersection of Kamehameha Highway/Mahinui Road to execute left/through movements.

Figure 4.3 illustrates the Future Year 2040 With Traffic Signal forecast traffic volumes and LOS for the study intersection movements. Table 4.3 summarizes the Future Year 2040 LOS at the

study intersections compared to Base Year 2040 conditions. LOS worksheets are provided in Appendix C.

LEGEND

##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

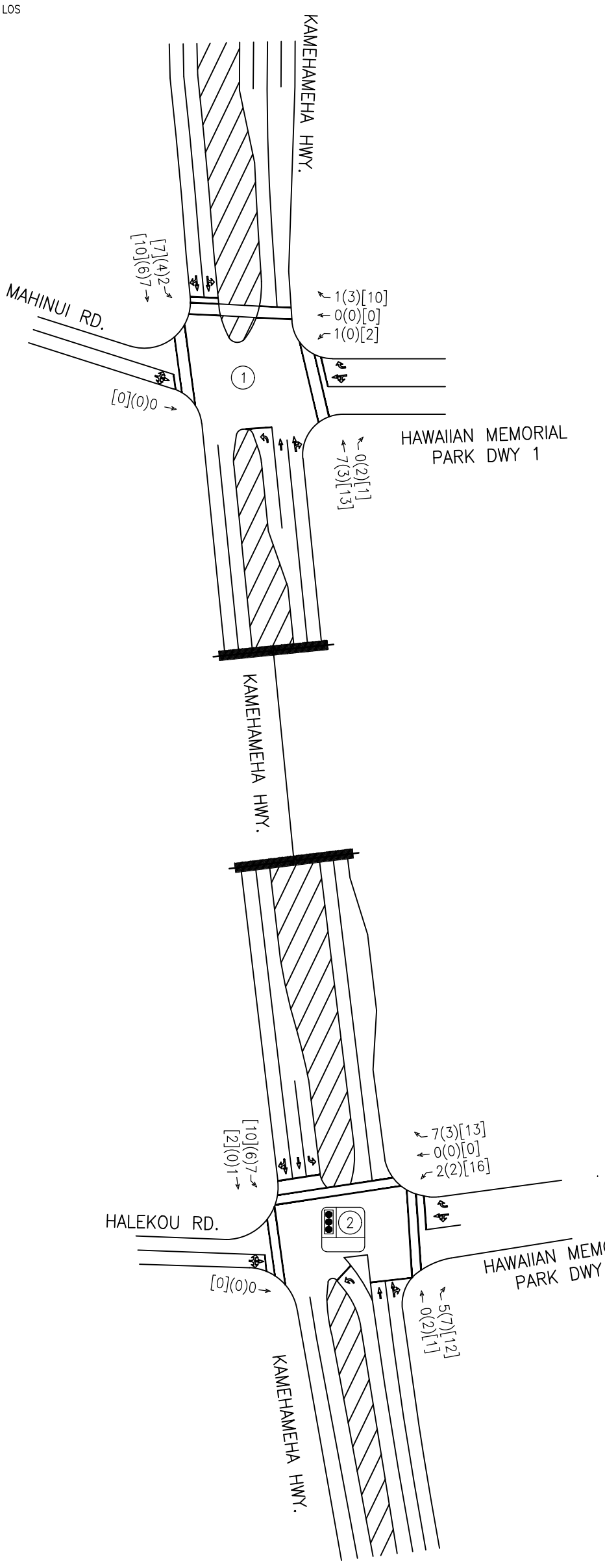
(X) – UNSIGNALIZED INTERSECTION Y

(Y) X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS

X(X)[X] – AM(PM)[WE] LOS

NORTH

NOT TO SCALE



NOTE:
THIS DRAWING IS FOR ILLUSTRATIVE PURPOSES ONLY. DO NOT USE FOR CONSTRUCTION.

HAWAIIAN MEMORIAL PARK CEMETERY EXPANSION TIAR

AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

PROJECT TRIPS

FIGURE 4.1

LEGEND

##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

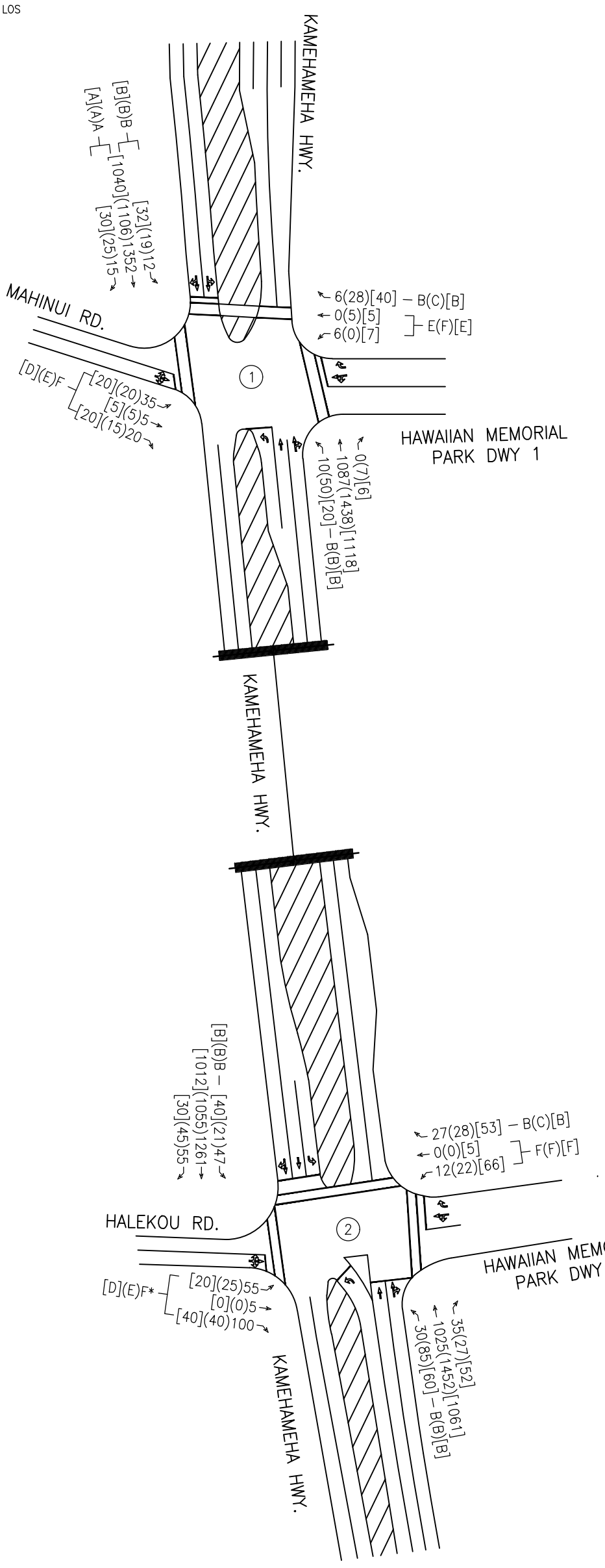
(X) – UNSIGNALIZED INTERSECTION Y

(Y) X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS

X(X)[X] – AM(PM)[WE] LOS

NORTH

NOT TO SCALE



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AUSTIN, TSUTSUMI & ASSOCIATES, INC.
ENGINEERS, SURVEYORS • HONOLULU, HAWAII

FUTURE YEAR 2040 WITHOUT TRAFFIC SIGNAL LANE CONFIGURATION, LOS AND VOLUMES

FIGURE 4.2

LEGEND

##(##)[##] – AM(PM)[WE] PEAK HOUR OF TRAFFIC VOLUMES

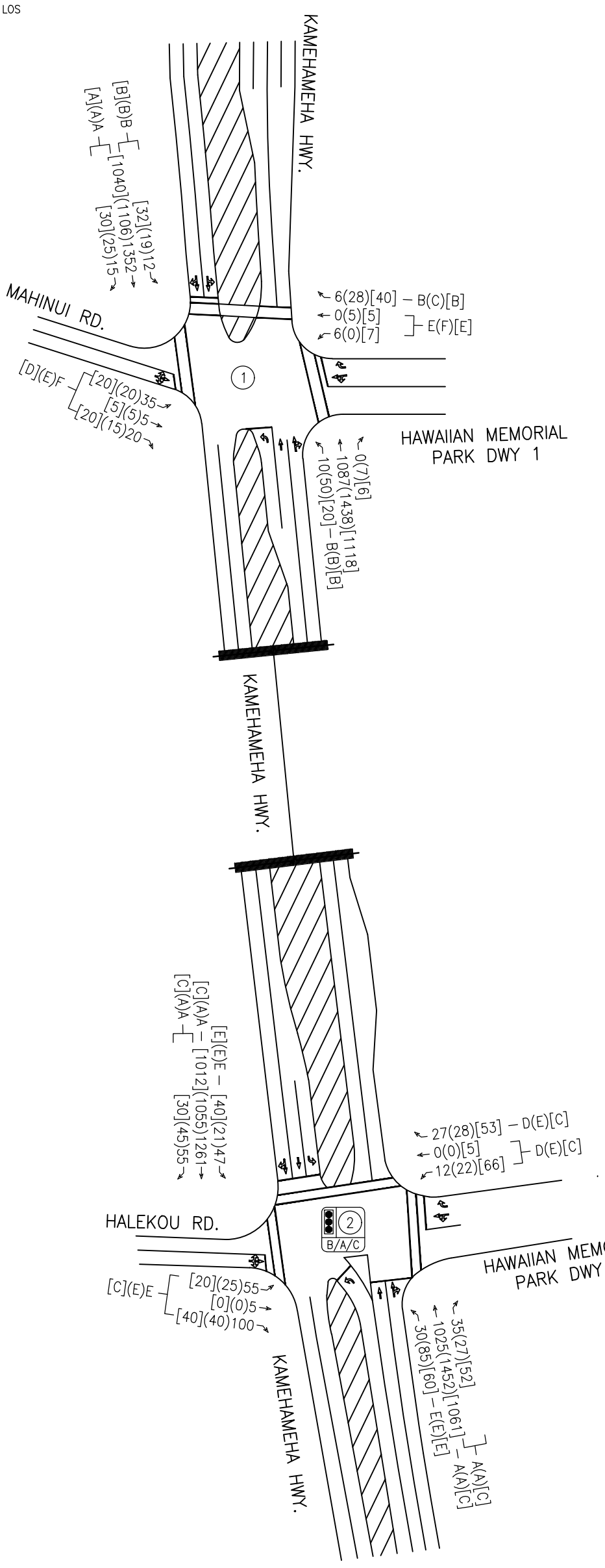
(X) – UNSIGNALIZED INTERSECTION Y

(Y) X/X/X – SIGNALIZED INTERSECTION Y, OVERALL AM/PM LOS

X(X)[X] – AM(PM)[WE] LOS

NORTH

NOT TO SCALE



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FUTURE YEAR 2040 WITH TRAFFIC SIGNAL LANE CONFIGURATION, LOS AND VOLUMES

FIGURE 4.3

Table 4.3: Future Year 2040 Level of Service Summary

Intersection	Future Year 2040 without Traffic Signal									Future Year 2040 with Traffic Signal								
	AM			PM			WE			AM			PM			WE		
	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS	HCM Delay	v/c Ratio	LOS
1: Kamehameha Highway & Mahinui Street/Project Access 1																		
NB LT	13.3	0.02	B	12.1	0.10	B	11.3	0.04	B	13.3	0.02	B	12.1	0.10	B	11.3	0.04	B
EB LT/TH/RT	60.8	0.52	F	47.9	0.35	E	33.6	0.28	D	60.8	0.52	F	47.9	0.35	E	33.6	0.28	D
WB LT/TH	38.2	0.06	E	61.6	0.08	F	42.9	0.12	E	38.2	0.06	E	61.6	0.08	F	42.5	0.12	E
WB RT	13.2	0.02	B	16.8	0.10	C	14.1	0.10	B	13.2	0.02	B	16.8	0.10	C	14.1	0.10	B
SB LT/TH	11.3	0.02	B	14.1	0.05	B	11.8	0.06	B	11.3	0.02	B	14.1	0.05	B	11.8	0.06	B
SB TH/RT	0.7	0.00	A	1.1	0.00	A	1.0	0.00	A	0.7	0.00	A	1.1	0.00	A	1.0	0.00	A
2: Kamehameha Highway & Halekou Road/Project Access 2																		
NB LT	13.2	0.07	B	12.4	0.16	B	11.6	0.11	B	72.3	0.67	E	66.8	0.79	E	70.7	0.78	E
NB TH	-	-	-	-	-	-	-	-	-	6.1	0.42	A	4.8	0.54	A	21.0	0.61	C
NB TH/RT	-	-	-	-	-	-	-	-	-	6.0	0.42	A	4.7	0.54	A	20.9	0.61	C
EB LT/TH/RT	136.8	1.05	F*	40.1	0.41	E	27.8	0.29	D	56.3	0.60	E	59.2	0.27	E	32.5	0.05	C
WB LT/TH	49.9	0.18	F	110.6	0.43	F	108.1	0.76	F	49.9	0.07	D	56.6	0.18	E	31.0	0.15	C
WB RT	13.5	0.07	B	17.3	0.09	C	14.4	0.13	B	49.5	0.05	D	55.5	0.05	E	29.6	0.04	C
SB LT	11.6	0.09	B	14.5	0.06	B	11.8	0.08	B	78.3	0.78	E	70.9	0.58	E	76.6	0.76	E
SB TH	-	-	-	-	-	-	-	-	-	6.7	0.51	A	5.3	0.42	A	21.4	0.58	C
SB TH/RT	-	-	-	-	-	-	-	-	-	6.7	0.52	A	5.2	0.42	A	21.3	0.58	C
Overall	9.0	-	-	2.5	-	-	4.6	-	-	10.8	-	B	8.3	-	A	23.8	-	C

* Denotes overcapacity condition, v/c ≥ 1.0

5. CONCLUSION AND RECOMMENDATIONS

The Project is approximately 53.45 acres in size, and is a portion of a larger 164.4 acre parcel adjacent to the Ocean View Garden. The Project entails 28.2 acres of cemetery use, 14.5 acres of cultural preserve, 7.75 acres of open space, and 3 acres of open roadway. The vehicular accesses to the Project will occur at the two (2) existing driveways along Kamehameha Highway, at the intersections of Mahinui Road and Halekou Road. The Project is expected to be completed by Year 2040.

5.1 Existing Conditions

The Project is generally located in the Kaneohe region on the island of Oahu. In the vicinity of the Project, Kamehameha Highway serves the area as the main thoroughfare that connects Pali Highway to the Likelike Highway and Kahekili Highway.

Within the Project vicinity, vehicles making left-turns from the minor east-west approaches are able to use the space created by the wide median to turn onto or off of Kamehameha Highway in two (2) stages during gaps in major through traffic, which is suspected to be when the upstream and downstream traffic signal minor movements phase is occurring; no significant queueing was observed at the study intersections.

All traffic movements at the study intersections currently operate at overall LOS D or better, except for the minor street movements at both of the study intersections, which appear to operate at LOS E/F during all peak hours of traffic.

5.2 Base Year 2040 Conditions

Traffic growth in the study area was estimated for Year 2040 by using the Oahu Regional Travel Demand Model (ORTDM) which forecast growth for years between 2007 and 2035. The resulting annual growth rate along Kamehameha Highway was determined to be approximately 0.4 percent per year. This growth rate was applied to all movements to represent regional traffic growth within the vicinity of the Project. No nearby developments are assumed to be completed by Year 2040.

A traffic signal study for the intersection of Kamehameha Highway/Halekou Road is currently underway by HDOT. The following two scenarios below were studied based on possible findings that may result from HDOT's traffic signal study.

5.2.1 Base Year 2040 without Traffic Signal

All study intersections are forecast to operate with LOS similar to existing conditions at LOS D or better, except for the eastbound movement at Halekou Road, which is anticipated to worsen and operate overcapacity at LOS F conditions. The minor street movements will continue to experience delay and is forecast to operate at LOS E/F conditions during all peak hours of traffic due to relative high speeds and available sight distances along Kamehameha Highway.

5.2.2 Base Year 2040 with Traffic Signal

In the scenario that a traffic signal is warranted based on the findings from the HDOT study, the Kamehameha Highway/Halekou Road intersection is anticipated to operate at an overall LOS of C or better during all peak hour of traffic. In addition, all major through movements are anticipated

to operate at LOS C or better and all other minor and turning movements will operate under-capacity at LOS E or better during all peak hours of traffic.

5.3 Future Year 2040 with the Project

The Project proposes to expand the current 80 acres to include 53.45 acres on a larger 164.4 acre parcel. Vehicular access to the Project will occur at the two (2) existing driveways along Kamehameha Highway, at the intersections of Mahinui Road and Halekou Road. The Project is anticipated to generate approximately 25(27)[71] total trips during the AM(PM)[Sat MD] peak hour of traffic.

Similarly to Base Year 2040, the traffic signal study for the intersection of Kamehameha Highway/Halekou Road is currently underway by HDOT. The following two scenarios below were studied based on possible findings that may result from HDOT's traffic signal study.

5.3.1 Future Year 2040 without Traffic Signal

Upon completion of the Project, all study intersections are forecast to operate with LOS similar to Base Year 2040 conditions at LOS E or better. The eastbound and westbound movements at the study intersections are forecast to worsen to operate at LOS E/F, except for the eastbound movement at Halekou Road, which will continue to operate overcapacity at LOS F during the AM peak hour of traffic.

5.3.2 Future Year 2040 with Traffic Signal

In the scenario that a traffic signal is warranted at the intersection of Kamehameha Highway/Halekou Road upon completion of the Project, the study intersection is anticipated to improve with all movements operating at LOS E or better during all peak hours of traffic. A traffic signal at the intersection of Kamehameha Highway/Halekou Road is expected to create gaps in traffic for the minor street movements at the intersection of Kamehameha Highway/Mahinui Road to execute left/through movements.

5.4 Recommendations

Based on the analysis of the traffic data, the following are the recommendations for the Project:

- Stripe westbound approaches at the study intersections as a shared left/through with a separate right turn lane to reflect current operating laneage.

6. REFERENCES

1. Institute of Transportation Engineers (ITE), Manual of Transportation Engineering Studies, 1994.
2. HHF Planners, Environmental Impact Statement Preparation Notice, 2017.
3. Transportation Research Board, Highway Capacity Manual 6th Edition, 2016.
4. Federal Highway Administration (FHWA), Manual on Uniform Traffic Control Devices (MUTCD), 2009

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APPENDICES

APPENDIX A

TRAFFIC COUNT DATA

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Phone: 533-3646 Fax: 526-1267

File Name : AM_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				HALEKOU RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00	3	276	1	1	1	0	1	0	0	71	2	0	3	0	26	2	387
06:15	7	322	2	2	0	0	4	0	1	81	1	0	4	0	31	2	457
06:30	2	308	5	1	0	1	7	0	4	118	1	0	6	0	40	0	493
06:45	5	270	4	4	1	0	2	0	6	106	0	0	6	0	37	3	444
Total	17	1176	12	8	2	1	14	0	11	376	4	0	19	0	134	7	1781
07:00	4	297	12	2	0	0	1	1	2	135	3	0	10	0	23	0	490
07:15	10	349	17	0	0	0	4	0	3	178	5	0	13	0	29	0	608
07:30	13	282	12	0	2	0	5	0	12	237	6	0	18	1	25	1	614
07:45	7	274	15	1	2	0	3	0	5	270	10	0	12	0	19	0	618
Total	34	1202	56	3	4	0	13	1	22	820	24	0	53	1	96	1	2330
08:00	7	243	11	1	2	0	7	0	6	246	7	0	9	0	25	1	565
08:15	4	256	4	1	2	0	1	0	8	208	3	0	6	0	24	0	517
08:30	4	260	10	0	1	0	6	0	8	213	4	0	2	0	16	0	524
08:45	2	233	6	0	0	0	4	0	9	208	9	0	5	2	17	0	495
Total	17	992	31	2	5	0	18	0	31	875	23	0	22	2	82	1	2101
Grand Total	68	3370	99	13	11	1	45	1	64	2071	51	0	94	3	312	9	6212
Apprch %	1.9	94.9	2.8	0.4	19	1.7	77.6	1.7	2.9	94.7	2.3	0	22.5	0.7	74.6	2.2	
Total %	1.1	54.2	1.6	0.2	0.2	0	0.7	0	1	33.3	0.8	0	1.5	0	5	0.1	
Motorcycles	0	14	0	0	0	0	0	0	0	7	0	0	0	0	2	0	23
% Motorcycles	0	0.4	0	0	0	0	0	0	0	0.3	0	0	0	0	0.6	0	0.4
Cars	50	2567	86	0	4	1	31	0	56	1603	40	0	76	3	256	0	4773
% Cars	73.5	76.2	86.9	0	36.4	100	68.9	0	87.5	77.4	78.4	0	80.9	100	82.1	0	76.8
Light Goods Vehicles	16	731	11	0	5	0	10	0	7	399	9	0	17	0	53	0	1258
% Light Goods Vehicles	23.5	21.7	11.1	0	45.5	0	22.2	0	10.9	19.3	17.6	0	18.1	0	17	0	20.3
Buses	1	26	1	0	0	0	1	0	1	25	0	0	1	0	0	0	56
% Buses	1.5	0.8	1	0	0	0	2.2	0	1.6	1.2	0	0	1.1	0	0	0	0.9
Single-Unit Trucks	1	26	0	0	2	0	2	0	0	31	2	0	0	0	1	0	65
% Single-Unit Trucks	1.5	0.8	0	0	18.2	0	4.4	0	0	1.5	3.9	0	0	0	0.3	0	1
Articulated Trucks	0	5	0	0	0	0	1	0	0	4	0	0	0	0	0	0	10
% Articulated Trucks	0	0.1	0	0	0	0	2.2	0	0	0.2	0	0	0	0	0	0	0.2
Bicycles on Road	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	4
% Bicycles on Road	0	0	1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	13	0	0	0	1	0	0	0	0	0	0	0	9	23
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.4

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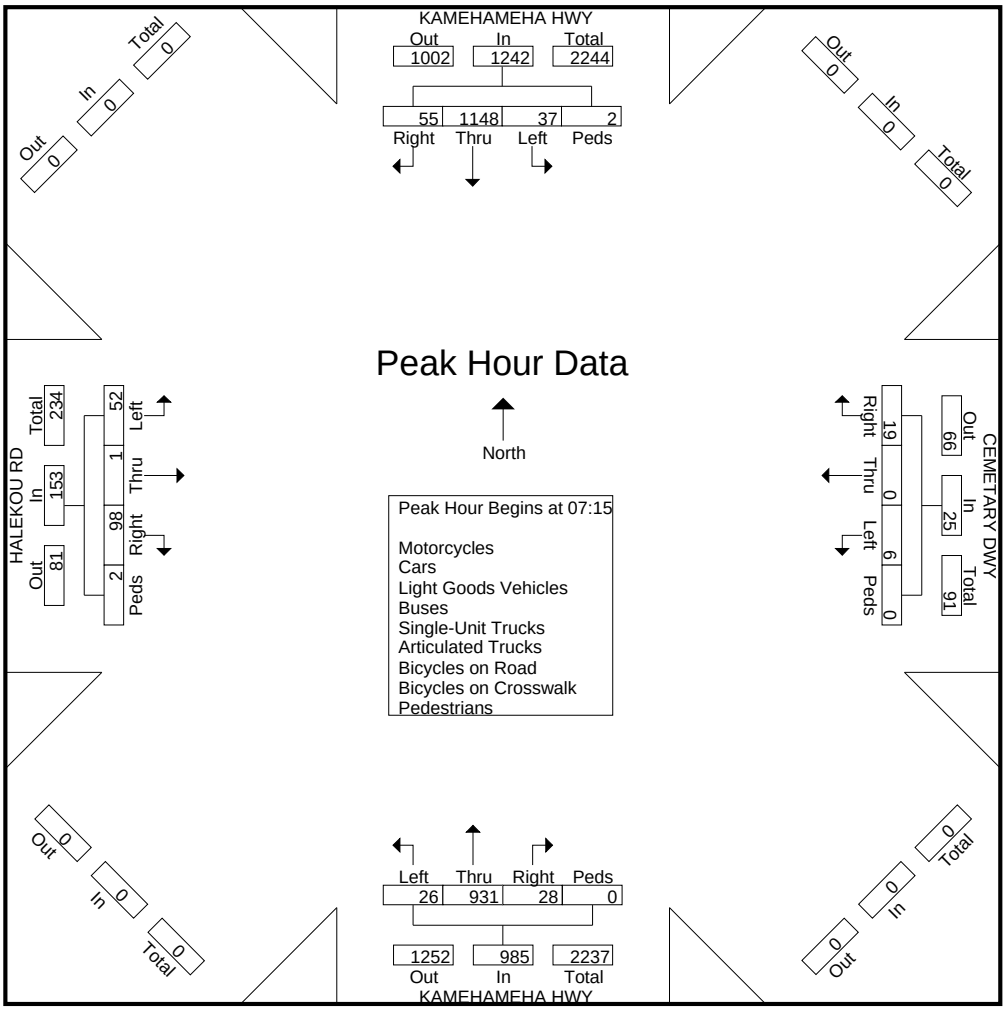
File Name : AM_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 2

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					HALEKOU RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	10	**349**	**17**	0	**376**	0	0	4	0	4	3	178	5	0	186	13	0	**29**	0	42	608
07:30	**13**	282	12	0	307	**2**	0	5	0	7	**12**	237	6	0	255	**18**	**1**	25	**1**	**45**	614
07:45	7	274	15	**1**	297	2	0	3	0	5	5	**270**	**10**	0	**285**	12	0	19	0	31	**618**
08:00	7	243	11	1	262	2	0	**7**	0	**9**	6	246	7	0	259	9	0	25	1	35	565
Total Volume	37	1148	55	2	1242	6	0	19	0	25	26	931	28	0	985	52	1	98	2	153	2405
% App. Total	3	92.4	4.4	0.2		24	0	76	0		2.6	94.5	2.8	0		34	0.7	64.1	1.3		
PHF	.712	.822	.809	.500	.826	.750	.000	.679	.000	.694	.542	.862	.700	.000	.864	.722	.250	.845	.500	.850	.973



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Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				MAHINUI RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
06:00	0	262	1	1	0	0	0	0	1	74	0	0	3	0	6	3	351
06:15	0	319	2	2	0	0	0	1	1	88	0	0	5	0	11	1	430
06:30	0	299	1	0	0	0	0	0	1	126	1	0	4	0	12	2	446
06:45	0	266	4	1	0	0	0	0	1	117	0	0	5	0	10	4	408
Total	0	1146	8	4	0	0	0	1	4	405	1	0	17	0	39	10	1635
07:00	1	299	2	1	0	0	1	0	0	143	0	0	5	0	12	0	464
07:15	1	356	1	0	1	0	1	0	3	191	0	0	8	0	11	0	573
07:30	0	307	4	2	0	0	0	0	2	259	0	0	12	1	1	2	590
07:45	3	299	4	1	0	0	3	0	3	270	0	0	7	1	4	1	596
Total	5	1261	11	4	1	0	5	0	8	863	0	0	32	2	28	3	2223
08:00	2	261	2	1	1	0	1	1	2	265	0	0	4	0	3	0	543
08:15	5	265	2	0	0	0	4	0	3	213	0	0	4	0	2	1	499
08:30	1	246	4	0	0	0	3	0	3	225	0	0	4	0	13	1	500
08:45	1	241	4	1	1	0	5	0	3	203	1	0	1	0	5	0	466
Total	9	1013	12	2	2	0	13	1	11	906	1	0	13	0	23	2	2008
Grand Total	14	3420	31	10	3	0	18	2	23	2174	2	0	62	2	90	15	5866
Apprch %	0.4	98.4	0.9	0.3	13	0	78.3	8.7	1	98.9	0.1	0	36.7	1.2	53.3	8.9	
Total %	0.2	58.3	0.5	0.2	0.1	0	0.3	0	0.4	37.1	0	0	1.1	0	1.5	0.3	
Motorcycles	0	12	0	0	0	0	0	0	0	2	0	0	0	0	1	0	15
% Motorcycles	0	0.4	0	0	0	0	0	0	0	0.1	0	0	0	0	1.1	0	0.3
Cars	11	2633	29	0	3	0	15	0	18	1690	0	0	52	2	74	0	4527
% Cars	78.6	77	93.5	0	100	0	83.3	0	78.3	77.7	0	0	83.9	100	82.2	0	77.2
Light Goods Vehicles	2	710	2	0	0	0	3	0	5	412	2	0	10	0	15	0	1161
% Light Goods Vehicles	14.3	20.8	6.5	0	0	0	16.7	0	21.7	19	100	0	16.1	0	16.7	0	19.8
Buses	0	29	0	0	0	0	0	0	0	28	0	0	0	0	0	0	57
% Buses	0	0.8	0	0	0	0	0	0	0	1.3	0	0	0	0	0	0	1
Single-Unit Trucks	1	31	0	0	0	0	0	0	0	38	0	0	0	0	0	0	70
% Single-Unit Trucks	7.1	0.9	0	0	0	0	0	0	0	1.7	0	0	0	0	0	0	1.2
Articulated Trucks	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	5
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
% Bicycles on Road	0	0.1	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	10	0	0	0	2	0	0	0	0	0	0	0	15	27
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.5

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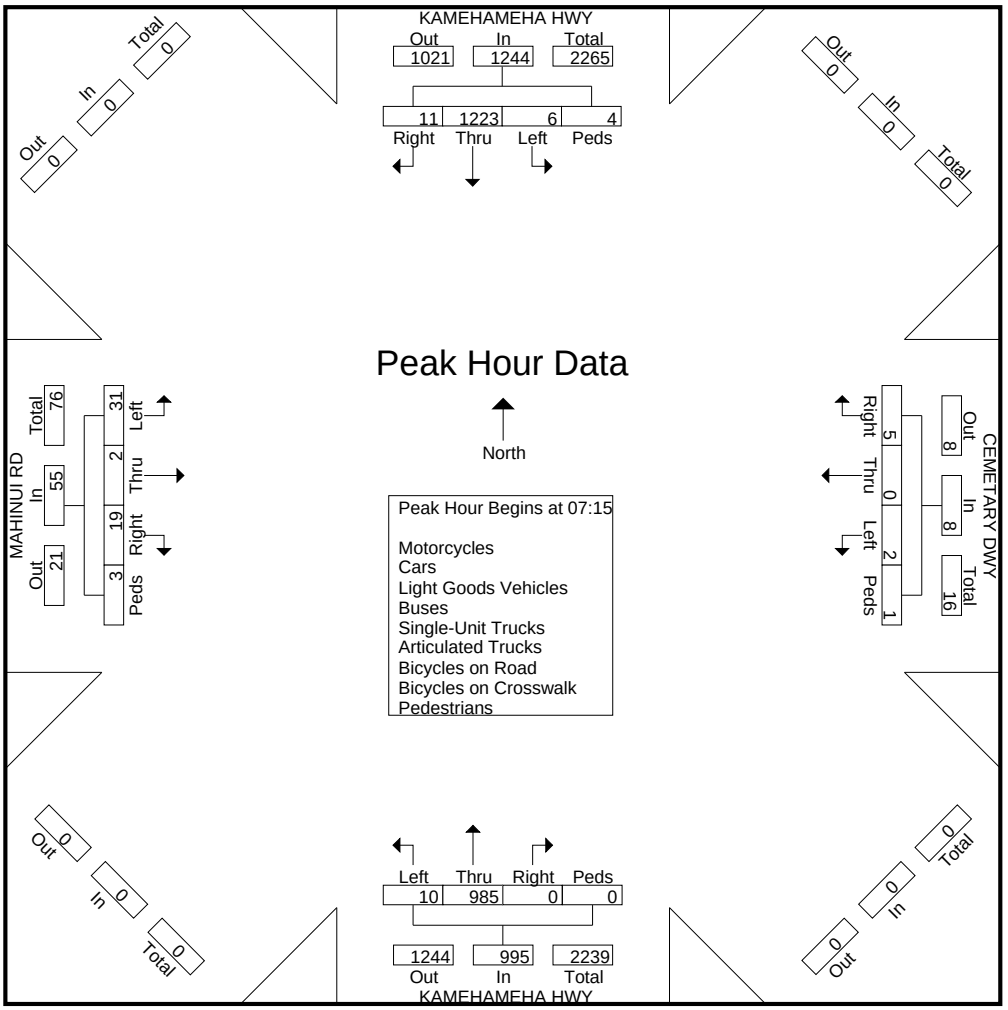
File Name : AM_Kamehameha Hwy - Mahinui Ave
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 2

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					MAHINUI RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 06:00 to 08:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15																					
07:15	1	**356**	1	0	**358**	**1**	0	1	0	2	**3**	191	0	0	194	8	0	**11**	0	**19**	573
07:30	0	307	**4**	**2**	313	0	0	0	0	0	2	259	0	0	261	**12**	**1**	1	**2**	16	590
07:45	**3**	299	4	1	307	0	0	**3**	0	**3**	3	**270**	0	0	**273**	7	1	4	1	13	**596**
08:00	2	261	2	1	266	1	0	1	**1**	3	2	265	0	0	267	4	0	3	0	7	543
Total Volume	6	1223	11	4	1244	2	0	5	1	8	10	985	0	0	995	31	2	19	3	55	2302
% App. Total	0.5	98.3	0.9	0.3		25	0	62.5	12.5		1	99	0	0		56.4	3.6	34.5	5.5		
PHF	.500	.859	.688	.500	.869	.500	.000	.417	.250	.667	.833	.912	.000	.000	.911	.646	.500	.432	.375	.724	.966



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File Name : PM_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				HALEKOU RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:00	11	245	9	3	10	0	8	0	13	302	3	0	5	0	7	2	618
15:15	4	267	7	0	4	0	4	0	16	323	3	0	7	0	10	0	645
15:30	4	204	11	1	4	1	4	0	19	358	4	0	5	0	12	1	628
15:45	3	209	12	1	6	0	8	0	18	335	3	0	8	0	10	0	613
Total	22	925	39	5	24	1	24	0	66	1318	13	0	25	0	39	3	2504
16:00	2	225	11	0	12	0	8	0	17	347	5	0	4	0	11	0	642
16:15	2	185	10	1	3	0	3	0	17	336	6	0	5	0	8	1	577
16:30	9	271	14	1	2	0	6	0	30	304	3	0	8	0	7	0	655
16:45	2	281	6	0	1	0	6	0	21	332	4	0	7	0	11	0	671
Total	15	962	41	2	18	0	23	0	85	1319	18	0	24	0	37	1	2545
17:00	1	272	7	3	4	0	17	0	18	330	1	0	2	0	8	2	665
17:15	6	235	10	2	3	0	2	0	21	302	2	0	4	0	5	0	592
17:30	5	197	5	3	3	0	8	0	31	307	5	0	9	0	6	0	579
17:45	1	198	7	0	4	0	7	0	14	296	1	0	3	0	8	0	539
Total	13	902	29	8	14	0	34	0	84	1235	9	0	18	0	27	2	2375
Grand Total	50	2789	109	15	56	1	81	0	235	3872	40	0	67	0	103	6	7424
Apprch %	1.7	94.1	3.7	0.5	40.6	0.7	58.7	0	5.7	93.4	1	0	38.1	0	58.5	3.4	
Total %	0.7	37.6	1.5	0.2	0.8	0	1.1	0	3.2	52.2	0.5	0	0.9	0	1.4	0.1	
Motorcycles	0	14	0	0	0	0	0	0	0	25	0	0	0	0	0	0	39
% Motorcycles	0	0.5	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.5
Cars	43	2247	87	0	44	0	70	0	187	2973	34	0	55	0	82	0	5822
% Cars	86	80.6	79.8	0	78.6	0	86.4	0	79.6	76.8	85	0	82.1	0	79.6	0	78.4
Light Goods Vehicles	7	483	22	0	12	1	11	0	48	818	6	0	12	0	20	0	1440
% Light Goods Vehicles	14	17.3	20.2	0	21.4	100	13.6	0	20.4	21.1	15	0	17.9	0	19.4	0	19.4
Buses	0	32	0	0	0	0	0	0	0	40	0	0	0	0	0	0	72
% Buses	0	1.1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Single-Unit Trucks	0	10	0	0	0	0	0	0	0	14	0	0	0	0	1	0	25
% Single-Unit Trucks	0	0.4	0	0	0	0	0	0	0	0.4	0	0	0	0	1	0	0.3
Articulated Trucks	0	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	6	21
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	100	0.3

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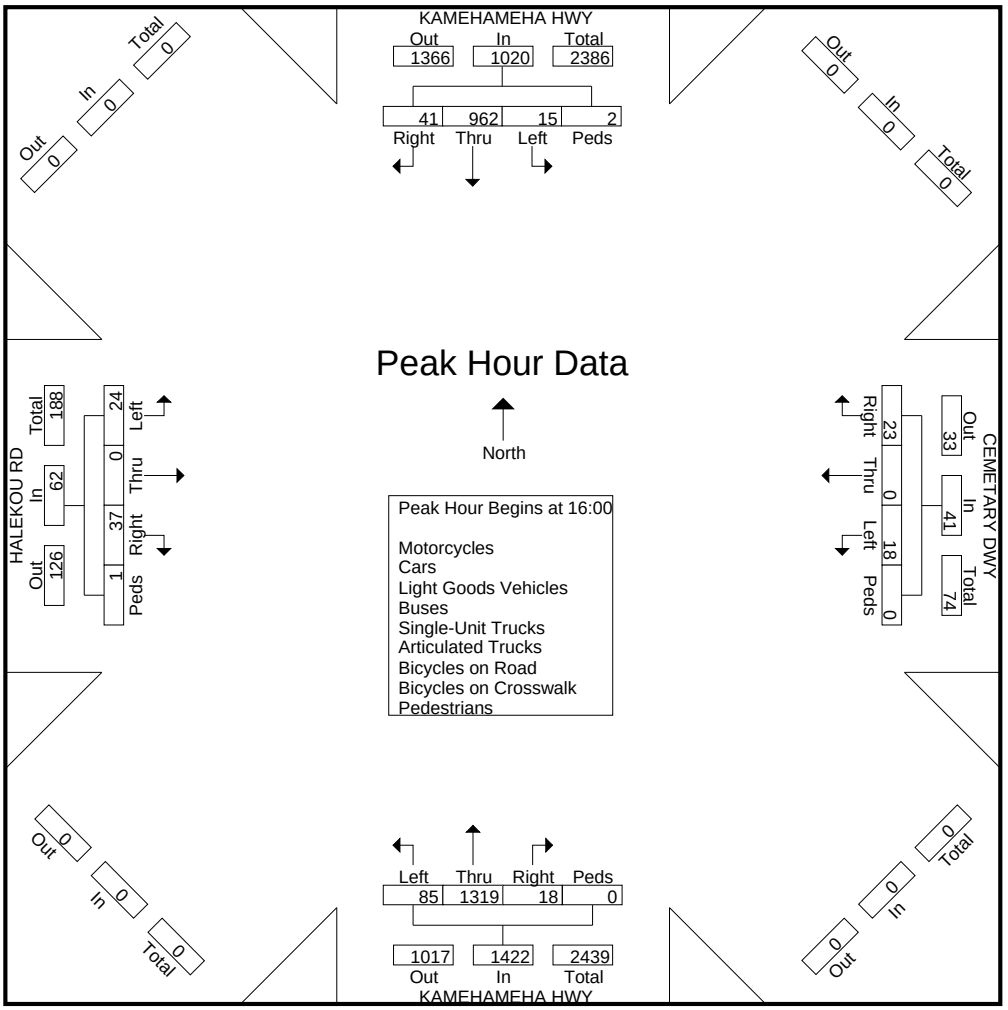
File Name : PM_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 2

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					HALEKOU RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	2	225	11	0	238	**12**	0	**8**	0	**20**	17	**347**	5	0	**369**	4	0	**11**	0	15	642
16:15	2	185	10	**1**	198	3	0	3	0	6	17	336	**6**	0	359	5	0	8	**1**	14	577
16:30	**9**	271	**14**	1	**295**	2	0	6	0	8	**30**	304	3	0	337	**8**	0	7	0	15	655
16:45	2	**281**	6	0	289	1	0	6	0	7	21	332	4	0	357	7	0	11	0	**18**	**671**
Total Volume	15	962	41	2	1020	18	0	23	0	41	85	1319	18	0	1422	24	0	37	1	62	2545
% App. Total	1.5	94.3	4	0.2		43.9	0	56.1	0		6	92.8	1.3	0		38.7	0	59.7	1.6		
PHF	.417	.856	.732	.500	.864	.375	.000	.719	.000	.513	.708	.950	.750	.000	.963	.750	.000	.841	.250	.861	.948



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File Name : PM_Kamehameha Hwy - Mahinui Ave
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				MAHINUI RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
15:00	2	262	7	0	0	0	4	0	3	317	0	0	5	0	1	0	601
15:15	4	279	11	0	0	0	2	0	6	328	0	0	6	0	1	0	637
15:30	1	222	4	0	1	0	4	0	2	349	0	0	3	0	1	0	587
15:45	3	224	5	0	0	0	4	0	4	364	0	0	3	0	4	2	613
Total	10	987	27	0	1	0	14	0	15	1358	0	0	17	0	7	2	2438
16:00	5	231	6	1	0	0	9	1	12	335	0	0	5	1	1	1	608
16:15	3	203	3	0	0	0	1	0	6	351	2	0	3	0	2	0	574
16:30	3	295	5	1	0	1	6	0	12	300	1	0	7	0	6	1	638
16:45	0	272	9	0	0	0	5	3	19	321	1	0	4	0	5	0	639
Total	11	1001	23	2	0	1	21	4	49	1307	4	0	19	1	14	2	2459
17:00	1	286	9	0	0	1	1	0	12	327	0	0	3	0	3	3	646
17:15	2	243	11	0	1	0	5	0	17	305	1	0	2	0	2	1	590
17:30	5	209	9	0	0	0	2	0	16	298	0	0	4	0	4	1	548
17:45	2	208	5	0	1	0	5	0	10	299	0	0	4	0	1	1	536
Total	10	946	34	0	2	1	13	0	55	1229	1	0	13	0	10	6	2320
Grand Total	31	2934	84	2	3	2	48	4	119	3894	5	0	49	1	31	10	7217
Apprch %	1	96.2	2.8	0.1	5.3	3.5	84.2	7	3	96.9	0.1	0	53.8	1.1	34.1	11	
Total %	0.4	40.7	1.2	0	0	0	0.7	0.1	1.6	54	0.1	0	0.7	0	0.4	0.1	
Motorcycles	0	13	0	0	0	0	0	0	0	25	0	0	0	0	0	0	38
% Motorcycles	0	0.4	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.5
Cars	30	2364	77	0	3	2	36	0	94	2965	4	0	42	1	29	0	5647
% Cars	96.8	80.6	91.7	0	100	100	75	0	79	76.1	80	0	85.7	100	93.5	0	78.2
Light Goods Vehicles	1	514	6	0	0	0	12	0	25	851	1	0	7	0	2	0	1419
% Light Goods Vehicles	3.2	17.5	7.1	0	0	0	25	0	21	21.9	20	0	14.3	0	6.5	0	19.7
Buses	0	28	0	0	0	0	0	0	0	39	0	0	0	0	0	0	67
% Buses	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.9
Single-Unit Trucks	0	12	1	0	0	0	0	0	0	13	0	0	0	0	0	0	26
% Single-Unit Trucks	0	0.4	1.2	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.4
Articulated Trucks	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
% Articulated Trucks	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Road	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	0	0	0	4	0	0	0	0	0	0	0	10	16
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.2

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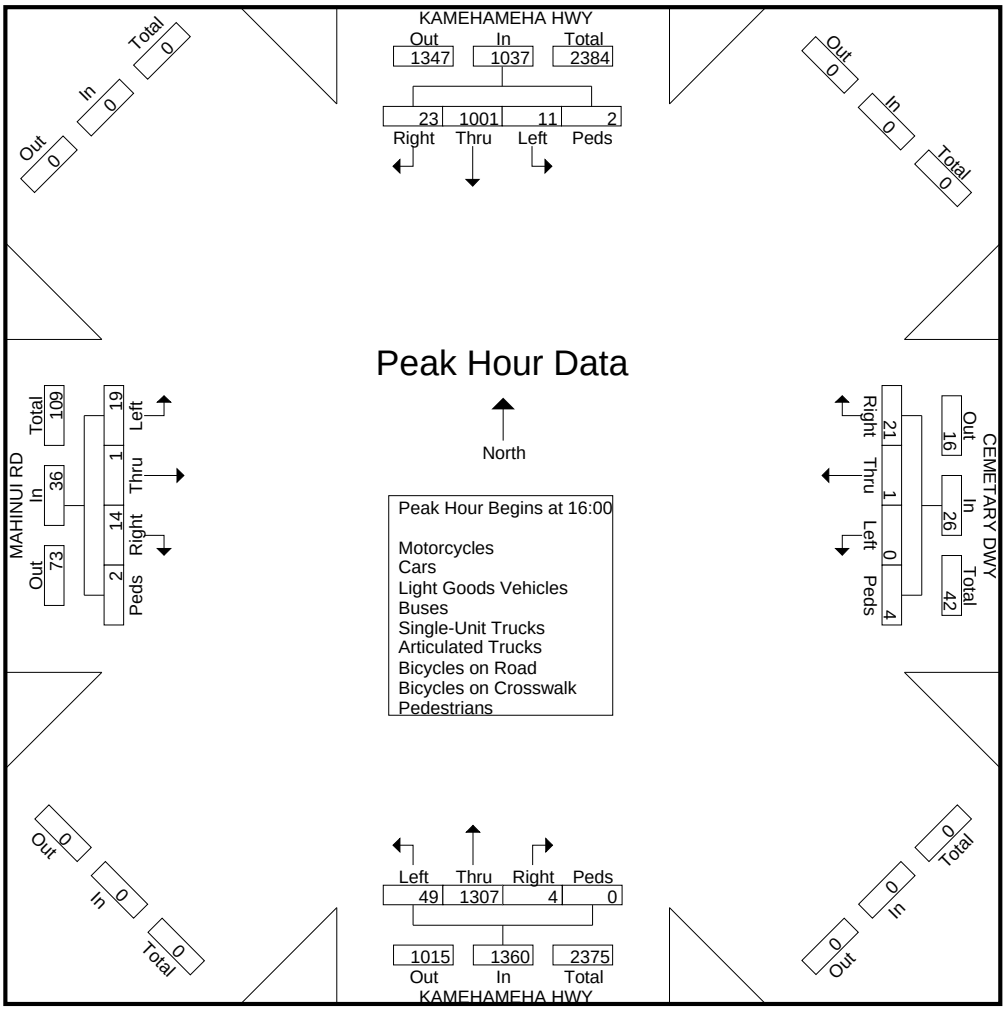
File Name : PM_Kamehameha Hwy - Mahinui Ave
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/26/2017
Page No : 2

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					MAHINUI RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 16:45 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 16:00																					
16:00	**5**	231	6	**1**	243	0	0	**9**	1	**10**	12	335	0	0	347	5	**1**	1	**1**	8	608
16:15	3	203	3	0	209	0	0	1	0	1	6	**351**	**2**	0	**359**	3	0	2	0	5	574
16:30	3	**295**	5	1	**304**	0	**1**	6	0	7	12	300	1	0	313	**7**	0	**6**	1	**14**	638
16:45	0	272	**9**	0	281	0	0	5	**3**	8	**19**	321	1	0	341	4	0	5	0	9	**639**
Total Volume	11	1001	23	2	1037	0	1	21	4	26	49	1307	4	0	1360	19	1	14	2	36	2459
% App. Total	1.1	96.5	2.2	0.2		0	3.8	80.8	15.4		3.6	96.1	0.3	0		52.8	2.8	38.9	5.6		
PHF	.550	.848	.639	.500	.853	.000	.250	.583	.333	.650	.645	.931	.500	.000	.947	.679	.250	.583	.500	.643	.962



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File Name : WE_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/30/2017
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				HALEKOU RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
09:00	6	200	3	3	4	1	6	0	5	159	12	0	5	0	15	2	421
09:15	11	187	5	0	4	0	9	0	9	194	13	0	6	0	20	0	458
09:30	8	226	4	0	9	0	7	0	7	212	15	0	3	0	16	2	509
09:45	11	224	4	1	7	1	13	0	8	227	27	0	2	0	10	1	536
Total	36	837	16	4	24	2	35	0	29	792	67	0	16	0	61	5	1924
10:00	8	187	1	1	6	0	12	0	6	219	23	0	6	0	11	1	481
10:15	7	217	5	1	6	0	12	0	11	234	22	0	6	0	13	2	536
10:30	19	190	2	0	6	0	15	0	8	235	18	0	6	0	10	1	510
10:45	6	247	5	0	10	0	8	0	11	217	13	0	5	0	8	3	533
Total	40	841	13	2	28	0	47	0	36	905	76	0	23	0	42	7	2060
11:00	12	249	5	1	7	0	12	0	10	246	4	0	5	0	10	1	562
11:15	5	235	12	2	12	0	7	0	12	260	13	0	1	0	15	0	574
11:30	10	216	7	1	8	0	11	0	7	236	15	0	5	0	17	2	535
11:45	7	206	4	0	4	1	13	0	17	255	8	0	6	0	8	0	529
Total	34	906	28	4	31	1	43	0	46	997	40	0	17	0	50	3	2200
12:00	8	259	9	0	15	0	10	0	11	257	10	0	5	0	12	0	596
12:15	4	228	7	0	8	0	12	0	6	204	11	0	4	0	8	0	492
12:30	11	225	8	0	11	0	11	0	22	247	9	0	4	0	9	0	557
12:45	7	222	7	0	17	0	11	0	19	262	10	0	7	0	8	1	571
Total	30	934	31	0	51	0	44	0	58	970	40	0	20	0	37	1	2216
13:00	5	219	9	0	2	0	15	0	11	254	10	0	3	0	10	0	538
13:15	13	233	5	0	13	0	14	0	14	260	5	0	4	1	16	0	578
13:30	6	250	5	1	17	0	10	0	14	272	7	0	4	0	10	2	598
13:45	8	222	2	3	4	0	9	0	11	244	6	0	4	1	9	0	523
Total	32	924	21	4	36	0	48	0	50	1030	28	0	15	2	45	2	2237
14:00	6	226	8	0	1	0	9	0	11	269	9	0	2	0	8	0	549
14:15	9	230	3	1	0	0	8	0	8	254	7	0	1	0	13	0	534
14:30	6	212	3	0	7	0	9	0	10	262	2	0	2	0	8	1	522
14:45	7	215	6	0	8	0	5	0	10	246	10	0	1	0	7	0	515
Total	28	883	20	1	16	0	31	0	39	1031	28	0	6	0	36	1	2120
Grand Total	200	5325	129	15	186	3	248	0	258	5725	279	0	97	2	271	19	12757
Apprch %	3.5	93.9	2.3	0.3	42.6	0.7	56.8	0	4.1	91.4	4.5	0	24.9	0.5	69.7	4.9	
Total %	1.6	41.7	1	0.1	1.5	0	1.9	0	2	44.9	2.2	0	0.8	0	2.1	0.1	
Motorcycles	0	24	0	0	2	0	0	0	1	35	2	0	1	0	0	0	65
% Motorcycles	0	0.5	0	0	1.1	0	0	0	0.4	0.6	0.7	0	1	0	0	0	0.5
Cars	157	4562	105	0	149	3	200	0	195	4564	234	0	75	2	215	0	10461
% Cars	78.5	85.7	81.4	0	80.1	100	80.6	0	75.6	79.7	83.9	0	77.3	100	79.3	0	82
Light Goods Vehicles	43	677	23	0	35	0	48	0	62	1027	43	0	21	0	56	0	2035
% Light Goods Vehicles	21.5	12.7	17.8	0	18.8	0	19.4	0	24	17.9	15.4	0	21.6	0	20.7	0	16
Buses	0	25	0	0	0	0	0	0	0	55	0	0	0	0	0	0	80
% Buses	0	0.5	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.6
Single-Unit Trucks	0	35	0	0	0	0	0	0	0	35	0	0	0	0	0	0	70
% Single-Unit Trucks	0	0.7	0	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.5
Articulated Trucks	0	1	0	0	0	0	0	0	0	8	0	0	0	0	0	0	9
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	3
% Bicycles on Road	0	0	0.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5.3	0
Pedestrians	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	18	33
% Pedestrians	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	94.7	0.3

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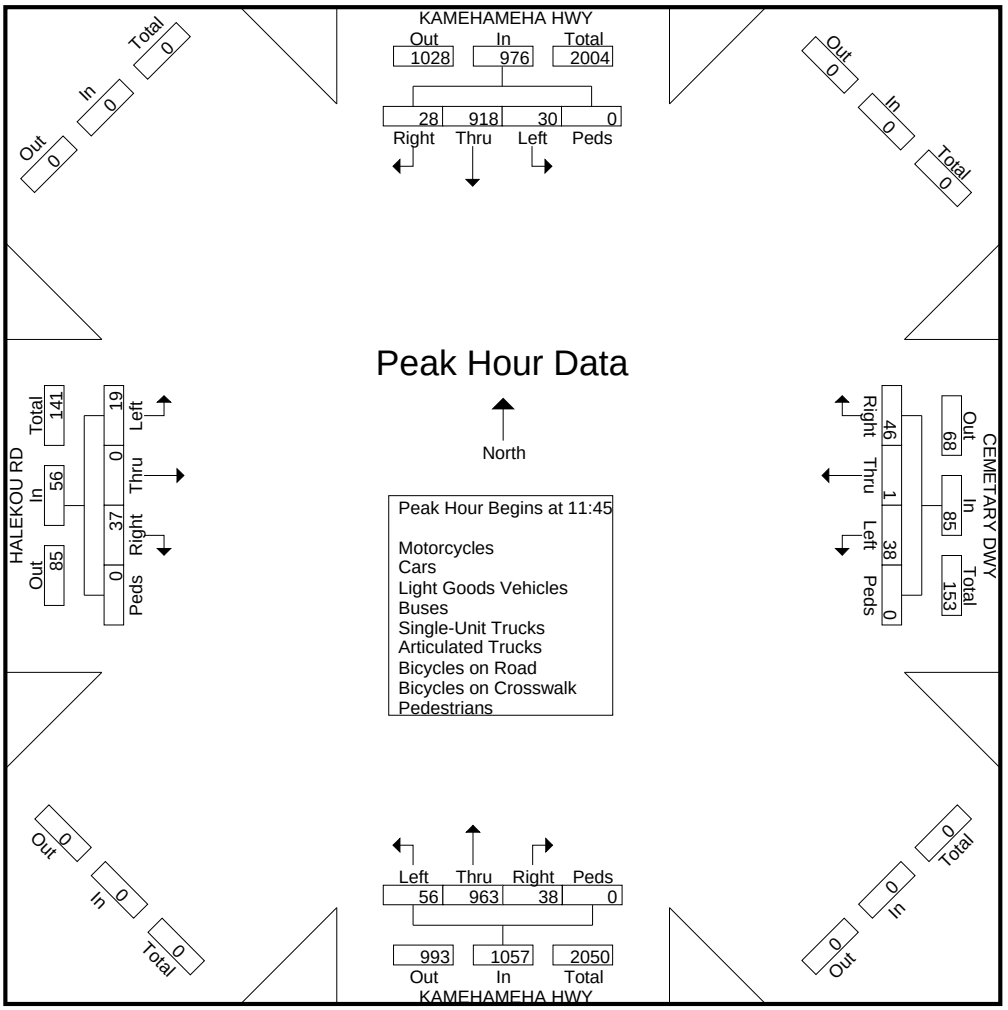
File Name : WE_Kamehameha Hwy - Halekou Rd
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/30/2017
Page No : 3

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					HALEKOU RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 to 12:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45																					
11:45	7	206	4	0	217	4	**1**	**13**	0	18	17	255	8	0	**280**	**6**	0	8	0	14	529
12:00	8	**259**	**9**	0	**276**	**15**	0	10	0	**25**	11	**257**	10	0	278	5	0	**12**	0	**17**	**596**
12:15	4	228	7	0	239	8	0	12	0	20	6	204	**11**	0	221	4	0	8	0	12	492
12:30	**11**	225	8	0	244	11	0	11	0	22	**22**	247	9	0	278	4	0	9	0	13	557
Total Volume	30	918	28	0	976	38	1	46	0	85	56	963	38	0	1057	19	0	37	0	56	2174
% App. Total	3.1	94.1	2.9	0		44.7	1.2	54.1	0		5.3	91.1	3.6	0		33.9	0	66.1	0		
PHF	.682	.886	.778	.000	.884	.633	.250	.885	.000	.850	.636	.937	.864	.000	.944	.792	.000	.771	.000	.824	.912



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File Name : WE_Kamehameha Hwy - Mahinui Ave
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/30/2017
Page No : 1

Groups Printed- Motorcycles - Cars - Light Goods Vehicles - Buses - Unit Trucks - Articulated Trucks - Bicycles on Road - Bicycles on Crosswalk - Pedestrians

	KAMEHAMEHA HWY SOUTHBOUND				CEMETARY DWY WESTBOUND				KAMEHAMEHA HWY NORTHBOUND				MAHINUI RD EASTBOUND				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
09:00	5	200	8	0	3	0	10	0	3	161	1	0	6	0	3	0	400
09:15	4	192	7	1	2	0	4	1	4	200	2	0	12	0	4	2	435
09:30	4	231	7	0	2	0	7	0	7	210	8	0	5	0	9	0	490
09:45	5	227	4	0	2	0	8	0	8	225	4	0	5	0	6	0	494
Total	18	850	26	1	9	0	29	1	22	796	15	0	28	0	22	2	1819
10:00	9	194	4	0	0	0	10	0	7	235	1	0	6	1	4	0	471
10:15	3	226	4	0	4	0	9	0	1	250	2	0	7	0	5	3	514
10:30	3	206	7	0	1	0	10	1	11	253	1	0	6	0	9	1	509
10:45	11	252	5	0	2	0	13	0	10	208	3	0	5	0	1	0	510
Total	26	878	20	0	7	0	42	1	29	946	7	0	24	1	19	4	2004
11:00	1	248	6	0	2	0	12	0	4	262	0	0	6	2	7	0	550
11:15	6	247	7	0	3	0	10	0	2	265	0	0	9	0	2	1	552
11:30	3	230	4	0	1	0	5	0	7	243	2	0	8	1	2	0	506
11:45	5	210	9	0	0	0	12	0	7	259	0	0	4	0	5	0	511
Total	15	935	26	0	6	0	39	0	20	1029	2	0	27	3	16	1	2119
12:00	2	267	7	0	1	1	2	0	5	265	0	0	2	1	5	0	558
12:15	9	230	5	0	0	0	11	0	2	225	1	0	4	0	1	0	488
12:30	8	231	7	1	2	0	2	0	5	258	0	0	6	0	8	0	528
12:45	6	227	10	0	1	0	6	0	5	273	0	0	2	0	7	0	537
Total	25	955	29	1	4	1	21	0	17	1021	1	0	14	1	21	0	2111
13:00	5	226	9	0	1	0	7	0	5	263	1	0	0	0	6	0	523
13:15	3	241	7	0	3	0	2	0	5	269	1	0	3	1	8	0	543
13:30	3	247	7	0	2	0	6	0	4	283	0	0	7	0	8	1	568
13:45	2	223	8	0	1	0	0	0	8	247	1	0	4	1	5	0	500
Total	13	937	31	0	7	0	15	0	22	1062	3	0	14	2	27	1	2134
14:00	2	238	4	0	2	1	1	0	4	278	0	0	10	1	3	0	544
14:15	3	244	7	0	2	1	4	0	5	254	1	0	3	2	5	0	531
14:30	3	209	5	0	1	1	5	0	9	256	0	0	1	0	2	0	492
14:45	7	229	4	0	0	1	5	0	5	238	2	0	0	0	3	0	494
Total	15	920	20	0	5	4	15	0	23	1026	3	0	14	3	13	0	2061
Grand Total	112	5475	152	2	38	5	161	2	133	5880	31	0	121	10	118	8	12248
Apprch %	2	95.4	2.6	0	18.4	2.4	78.2	1	2.2	97.3	0.5	0	47.1	3.9	45.9	3.1	
Total %	0.9	44.7	1.2	0	0.3	0	1.3	0	1.1	48	0.3	0	1	0.1	1	0.1	
Motorcycles	0	27	1	0	0	0	0	0	0	37	0	0	0	0	0	0	65
% Motorcycles	0	0.5	0.7	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0.5
Cars	96	4601	136	0	35	4	130	0	113	4692	30	0	97	9	99	0	10042
% Cars	85.7	84	89.5	0	92.1	80	80.7	0	85	79.8	96.8	0	80.2	90	83.9	0	82
Light Goods Vehicles	16	782	13	0	3	1	30	0	20	1051	1	0	24	1	19	0	1961
% Light Goods Vehicles	14.3	14.3	8.6	0	7.9	20	18.6	0	15	17.9	3.2	0	19.8	10	16.1	0	16
Buses	0	24	0	0	0	0	0	0	0	57	0	0	0	0	0	0	81
% Buses	0	0.4	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.7
Single-Unit Trucks	0	38	2	0	0	0	1	0	0	35	0	0	0	0	0	0	76
% Single-Unit Trucks	0	0.7	1.3	0	0	0	0.6	0	0	0.6	0	0	0	0	0	0	0.6
Articulated Trucks	0	2	0	0	0	0	0	0	0	7	0	0	0	0	0	0	9
% Articulated Trucks	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1
Bicycles on Road	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
% Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bicycles on Crosswalk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	8	12
% Pedestrians	0	0	0	100	0	0	0	100	0	0	0	0	0	0	0	100	0.1

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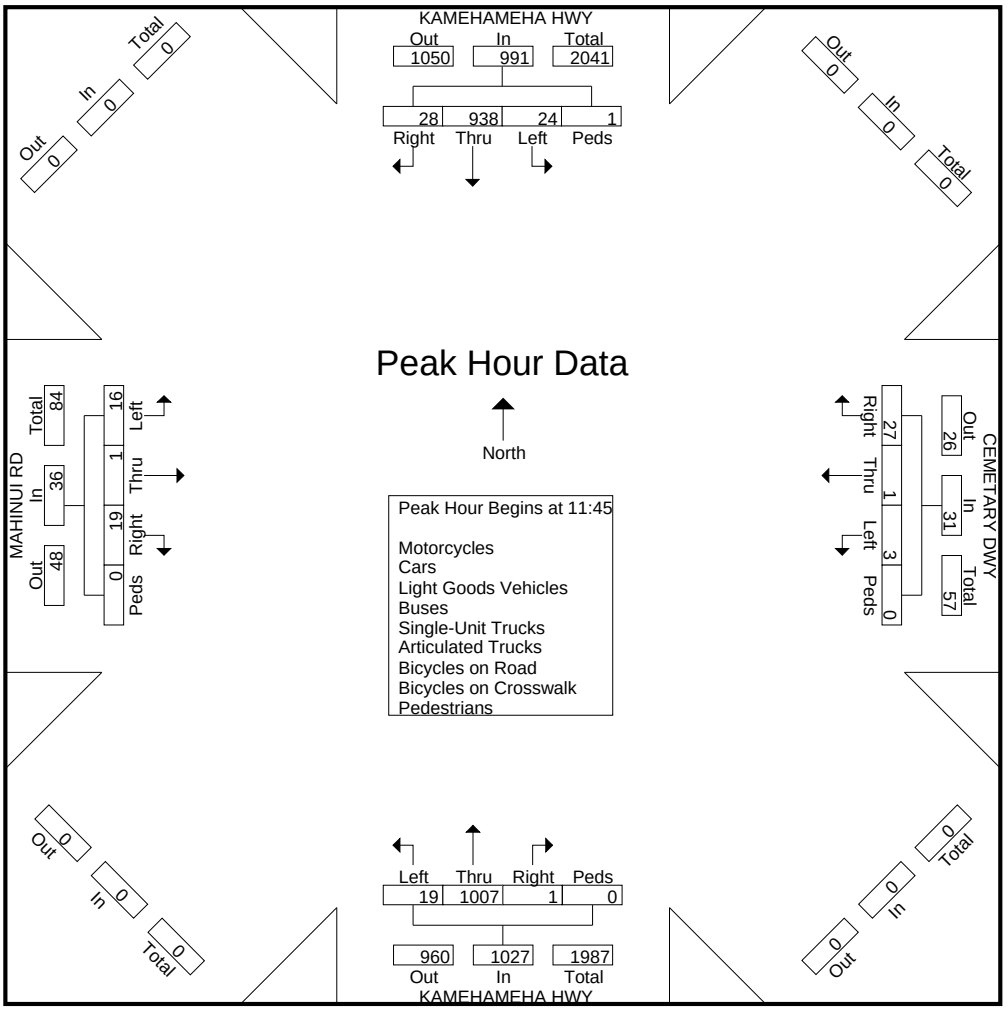
File Name : WE_Kamehameha Hwy - Mahinui Ave
Site Code : 17-095 Hawaii Memorial Park Cemetary
Start Date : 9/30/2017
Page No : 3

	KAMEHAMEHA HWY SOUTHBOUND					CEMETARY DWY WESTBOUND					KAMEHAMEHA HWY NORTHBOUND					MAHINUI RD EASTBOUND					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:45 to 12:30 - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 11:45																					
11:45	5	210	**9**	0	224	0	0	**12**	0	**12**	**7**	259	0	0	266	4	0	5	0	9	511
12:00	2	**267**	7	0	**276**	1	**1**	2	0	4	5	**265**	0	0	**270**	2	**1**	5	0	8	**558**
12:15	**9**	230	5	0	244	0	0	11	0	11	2	225	**1**	0	228	4	0	1	0	5	488
12:30	8	231	7	**1**	247	**2**	0	2	0	4	5	258	0	0	263	**6**	0	**8**	0	**14**	528
Total Volume	24	938	28	1	991	3	1	27	0	31	19	1007	1	0	1027	16	1	19	0	36	2085
% App. Total	2.4	94.7	2.8	0.1		9.7	3.2	87.1	0		1.9	98.1	0.1	0		44.4	2.8	52.8	0		
PHF	.667	.878	.778	.250	.898	.375	.250	.563	.000	.646	.679	.950	.250	.000	.951	.667	.250	.594	.000	.643	.934



APPENDIX B

LEVEL OF SERVICE CRITERIA

ENCLOSURE B – LEVEL OF SERVICE (LOS) CRITERIA

VEHICULAR LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 6th Edition)

Level of service for vehicles at signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in the table below.

Level-of Service Criteria for Signalized Intersections

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

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

VEHICULAR LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 6th Edition)

The level of service criteria for vehicles at unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

Level of Service Criteria for Two-Way Stop-Controlled Intersections

Level of Service	Average Control Delay (sec/veh)
A	≤ 10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	> 50

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing AM Conditions

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	31	2	19	2	0	5	10	985	0	6	1223	11
Future Vol, veh/h	31	2	19	2	0	5	10	985	0	6	1223	11
Conflicting Peds, #/hr	4	0	0	0	0	4	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	34	2	21	2	0	5	11	1071	0	7	1329	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1914	2446	674	1774	2452	541	1344	0	0	1072	0	0
Stage 1	1352	1352	-	1094	1094	-	-	-	-	-	-	-
Stage 2	562	1094	-	680	1358	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	41	31	397	52	30	485	509	-	-	646	-	-
Stage 1	158	217	-	228	288	-	-	-	-	-	-	-
Stage 2	479	288	-	407	215	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	38	29	396	46	28	483	508	-	-	645	-	-
Mov Cap-2 Maneuver	118	121	-	145	117	-	-	-	-	-	-	-
Stage 1	154	207	-	223	281	-	-	-	-	-	-	-
Stage 2	462	281	-	365	205	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	39.6	17.6	0.1	0.2
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	508	-	-	159	145	483	645	-	-
HCM Lane V/C Ratio	0.021	-	-	0.355	0.015	0.011	0.01	-	-
HCM Control Delay (s)	12.2	-	-	39.6	30.2	12.5	10.6	0.2	-
HCM Lane LOS	B	-	-	E	D	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.5	0	0	0	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	52	1	98	6	0	19	26	931	28	37	1148	55
Future Vol, veh/h	52	1	98	6	0	19	26	931	28	37	1148	55
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	6	6	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	1	107	7	0	21	28	1012	30	40	1248	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1924	2464	656	1794	2479	529	1310	0	0	1048	0	0
Stage 1	1360	1360	-	1089	1089	-	-	-	-	-	-	-
Stage 2	564	1104	-	705	1390	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 40	30	408	51	29	494	524	-	-	660	-	-
Stage 1	156	215	-	230	290	-	-	-	-	-	-	-
Stage 2	478	285	-	393	208	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 35	26	407	34	26	490	523	-	-	656	-	-
Mov Cap-2 Maneuver	110	109	-	120	106	-	-	-	-	-	-	-
Stage 1	147	201	-	216	273	-	-	-	-	-	-	-
Stage 2	433	268	-	271	195	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	65.7	18.5	0.3	0.3
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	523	-	-	209	120	490	656	-	-
HCM Lane V/C Ratio	0.054	-	-	0.785	0.054	0.042	0.061	-	-
HCM Control Delay (s)	12.3	-	-	65.7	36.7	12.7	10.8	-	-
HCM Lane LOS	B	-	-	F	E	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	5.5	0.2	0.1	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing PM Conditions

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	1	14	0	1	21	49	1307	4	11	1001	23
Future Vol, veh/h	19	1	14	0	1	21	49	1307	4	11	1001	23
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	1	15	0	1	23	53	1421	4	12	1088	25

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1942	2656	557	2098	2666	713	1113	0	0	1425	0	0
Stage 1	1125	1125	-	1529	1529	-	-	-	-	-	-	-
Stage 2	817	1531	-	569	1137	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	39	22	474	30	22	374	623	-	-	473	-	-
Stage 1	218	278	-	123	178	-	-	-	-	-	-	-
Stage 2	337	177	-	474	275	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	19	474	26	19	374	623	-	-	473	-	-
Mov Cap-2 Maneuver	120	95	-	87	91	-	-	-	-	-	-	-
Stage 1	199	259	-	113	163	-	-	-	-	-	-	-
Stage 2	288	162	-	426	257	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.8	16.7	0.4	0.5
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	623	-	-	171	91	374	473	-	-
HCM Lane V/C Ratio	0.085	-	-	0.216	0.012	0.061	0.025	-	-
HCM Control Delay (s)	11.3	-	-	31.8	45	15.3	12.8	0.4	-
HCM Lane LOS	B	-	-	D	E	C	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0.8	0	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	24	0	37	18	0	23	85	1319	18	15	962	41
Future Vol, veh/h	24	0	37	18	0	23	85	1319	18	15	962	41
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	0	40	20	0	25	92	1434	20	16	1046	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2005	2740	547	2183	2752	729	1092	0	0	1454	0	0
Stage 1	1102	1102	-	1628	1628	-	-	-	-	-	-	-
Stage 2	903	1638	-	555	1124	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	35	20	481	26	19	365	635	-	-	461	-	-
Stage 1	226	286	-	106	159	-	-	-	-	-	-	-
Stage 2	299	157	-	484	279	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	28	16	481	21	16	364	634	-	-	461	-	-
Mov Cap-2 Maneuver	107	81	-	71	77	-	-	-	-	-	-	-
Stage 1	193	276	-	91	136	-	-	-	-	-	-	-
Stage 2	238	134	-	428	269	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.1	41.2	0.7	0.2
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	634	-	-	203	71	364	461	-	-
HCM Lane V/C Ratio	0.146	-	-	0.327	0.276	0.069	0.035	-	-
HCM Control Delay (s)	11.6	-	-	31.1	74	15.6	13.1	-	-
HCM Lane LOS	B	-	-	D	F	C	B	-	-
HCM 95th %tile Q(veh)	0.5	-	-	1.3	1	0.2	0.1	-	-

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Existing Sat MD Conditions

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	16	1	19	3	1	27	19	1007	1	24	938	29
Future Vol, veh/h	16	1	19	3	1	27	19	1007	1	24	938	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	17	1	21	3	1	29	21	1095	1	26	1020	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1678	2226	526	1701	2242	548	1052	0	0	1096	0	0
Stage 1	1088	1088	-	1138	1138	-	-	-	-	-	-	-
Stage 2	590	1138	-	563	1104	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	62	43	496	60	42	480	657	-	-	633	-	-
Stage 1	230	290	-	214	275	-	-	-	-	-	-	-
Stage 2	461	275	-	478	285	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	52	37	496	51	37	480	657	-	-	633	-	-
Mov Cap-2 Maneuver	151	131	-	144	131	-	-	-	-	-	-	-
Stage 1	223	261	-	207	266	-	-	-	-	-	-	-
Stage 2	417	266	-	411	257	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.2	15.4	0.2	0.7
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	657	-	-	237	141	480	633	-	-
HCM Lane V/C Ratio	0.031	-	-	0.165	0.031	0.061	0.041	-	-
HCM Control Delay (s)	10.7	-	-	23.2	31.3	13	10.9	0.5	-
HCM Lane LOS	B	-	-	C	D	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	0.1	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	19	0	37	46	1	38	56	963	38	30	918	29
Future Vol, veh/h	19	0	37	46	1	38	56	963	38	30	918	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	21	0	40	50	1	41	61	1047	41	33	998	32

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1726	2290	515	1755	2286	544	1030	0	0	1088	0	0
Stage 1	1080	1080	-	1190	1190	-	-	-	-	-	-	-
Stage 2	646	1210	-	565	1096	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	57	39	505	54	39	483	670	-	-	637	-	-
Stage 1	233	293	-	199	259	-	-	-	-	-	-	-
Stage 2	427	254	-	477	287	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	46	34	505	~ 44	34	483	670	-	-	637	-	-
Mov Cap-2 Maneuver	136	121	-	127	117	-	-	-	-	-	-	-
Stage 1	212	278	-	181	235	-	-	-	-	-	-	-
Stage 2	353	231	-	416	272	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.8	34.2	0.6	0.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	670	-	-	263	127	483	637	-	-
HCM Lane V/C Ratio	0.091	-	-	0.231	0.402	0.086	0.051	-	-
HCM Control Delay (s)	10.9	-	-	22.8	51.2	13.1	11	-	-
HCM Lane LOS	B	-	-	C	F	B	B	-	-
HCM 95th %tile Q(veh)	0.3	-	-	0.9	1.7	0.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 without Traffic Signal AM Peak Conditions

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	5	20	5	0	5	10	1080	0	10	1345	15
Future Vol, veh/h	35	5	20	5	0	5	10	1080	0	10	1345	15
Conflicting Peds, #/hr	4	0	0	0	0	4	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	5	22	5	0	5	11	1174	0	11	1462	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2108	2692	742	1953	2700	592	1481	0	0	1175	0	0
Stage 1	1495	1495	-	1197	1197	-	-	-	-	-	-	-
Stage 2	613	1197	-	756	1503	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 29	21	358	38	21	449	450	-	-	590	-	-
Stage 1	129	185	-	197	257	-	-	-	-	-	-	-
Stage 2	446	257	-	366	183	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 26	18	357	31	18	447	449	-	-	589	-	-
Mov Cap-2 Maneuver	96	97	-	118	94	-	-	-	-	-	-	-
Stage 1	126	165	-	192	251	-	-	-	-	-	-	-
Stage 2	428	251	-	297	163	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60	25.1	0.1	0.7
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	449	-	-	127	118	447	589	-	-
HCM Lane V/C Ratio	0.024	-	-	0.514	0.046	0.012	0.018	-	-
HCM Control Delay (s)	13.2	-	-	60	37	13.2	11.2	0.6	-
HCM Lane LOS	B	-	-	F	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4	0.1	0	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	5	100	10	0	20	30	1025	30	40	1260	55
Future Vol, veh/h	55	5	100	10	0	20	30	1025	30	40	1260	55
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	6	6	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	5	109	11	0	22	33	1114	33	43	1370	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2113	2707	717	1977	2721	582	1432	0	0	1153	0	0
Stage 1	1488	1488	-	1203	1203	-	-	-	-	-	-	-
Stage 2	625	1219	-	774	1518	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 29	21	372	37	20	456	470	-	-	602	-	-
Stage 1	130	186	-	196	256	-	-	-	-	-	-	-
Stage 2	439	251	-	357	180	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 25	18	371	22	17	453	469	-	-	599	-	-
Mov Cap-2 Maneuver	90	90	-	96	85	-	-	-	-	-	-	-
Stage 1	121	172	-	181	237	-	-	-	-	-	-	-
Stage 2	388	232	-	227	167	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	128.1	24.6	0.4	0.3
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	469	-	-	171	96	453	599	-	-
HCM Lane V/C Ratio	0.07	-	-	1.017	0.113	0.048	0.073	-	-
HCM Control Delay (s)	13.2	-	-	128.1	47.2	13.3	11.5	-	-
HCM Lane LOS	B	-	-	F	E	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	8.3	0.4	0.2	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 without Traffic Signal PM Peak Conditions

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	15	0	5	25	50	1435	5	15	1100	25
Future Vol, veh/h	20	5	15	0	5	25	50	1435	5	15	1100	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	16	0	5	27	54	1560	5	16	1196	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2133	2915	612	2304	2926	783	1223	0	0	1565	0	0
Stage 1	1242	1242	-	1671	1671	-	-	-	-	-	-	-
Stage 2	891	1673	-	633	1255	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	28	15	436	21	15	337	566	-	-	418	-	-
Stage 1	185	245	-	100	151	-	-	-	-	-	-	-
Stage 2	304	151	-	434	241	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	12	436	16	12	337	566	-	-	418	-	-
Mov Cap-2 Maneuver	97	76	-	69	72	-	-	-	-	-	-	-
Stage 1	167	215	-	91	137	-	-	-	-	-	-	-
Stage 2	243	137	-	358	212	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	45.6	23.7	0.4	1
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	566	-	-	131	72	337	418	-	-
HCM Lane V/C Ratio	0.096	-	-	0.332	0.075	0.081	0.039	-	-
HCM Control Delay (s)	12	-	-	45.6	59	16.6	14	0.8	-
HCM Lane LOS	B	-	-	E	F	C	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.3	0.2	0.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	0	40	20	0	25	85	1450	20	15	1055	45
Future Vol, veh/h	25	0	40	20	0	25	85	1450	20	15	1055	45
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	43	22	0	27	92	1576	22	16	1147	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2179	2987	599	2377	3000	801	1197	0	0	1598	0	0
Stage 1	1205	1205	-	1771	1771	-	-	-	-	-	-	-
Stage 2	974	1782	-	606	1229	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 26	14	445	~ 18	13	327	579	-	-	406	-	-
Stage 1	195	255	-	86	135	-	-	-	-	-	-	-
Stage 2	270	133	-	451	248	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	11	445	~ 14	10	326	578	-	-	406	-	-
Mov Cap-2 Maneuver	90	67	-	57	63	-	-	-	-	-	-	-
Stage 1	164	245	-	72	114	-	-	-	-	-	-	-
Stage 2	208	112	-	391	238	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	38.2	55.1	0.7	0.2
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	578	-	-	177	57	326	406	-	-
HCM Lane V/C Ratio	0.16	-	-	0.399	0.381	0.083	0.04	-	-
HCM Control Delay (s)	12.4	-	-	38.2	102.8	17	14.2	-	-
HCM Lane LOS	B	-	-	E	F	C	B	-	-
HCM 95th %tile Q(veh)	0.6	-	-	1.8	1.4	0.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 without Traffic Signal Sat MD Peak Conditions

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	20	5	5	30	20	1105	5	25	1030	30
Future Vol, veh/h	20	5	20	5	5	30	20	1105	5	25	1030	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	22	5	5	33	22	1201	5	27	1120	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1838	2441	577	1865	2455	603	1153	0	0	1206	0	0
Stage 1	1191	1191	-	1248	1248	-	-	-	-	-	-	-
Stage 2	647	1250	-	617	1207	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	47	31	460	45	30	442	602	-	-	574	-	-
Stage 1	199	259	-	183	243	-	-	-	-	-	-	-
Stage 2	426	243	-	444	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	26	460	36	25	442	602	-	-	574	-	-
Mov Cap-2 Maneuver	128	110	-	120	109	-	-	-	-	-	-	-
Stage 1	192	225	-	176	234	-	-	-	-	-	-	-
Stage 2	371	234	-	358	220	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.5	20.3	0.2	0.9
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	602	-	-	184	114	442	574	-	-
HCM Lane V/C Ratio	0.036	-	-	0.266	0.095	0.074	0.047	-	-
HCM Control Delay (s)	11.2	-	-	31.5	39.9	13.8	11.6	0.7	-
HCM Lane LOS	B	-	-	D	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.3	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	40	50	5	40	60	1060	40	30	1010	30
Future Vol, veh/h	20	0	40	50	5	40	60	1060	40	30	1010	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	0	43	54	5	43	65	1152	43	33	1098	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1890	2506	566	1919	2501	598	1131	0	0	1195	0	0
Stage 1	1181	1181	-	1304	1304	-	-	-	-	-	-	-
Stage 2	709	1325	-	615	1197	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	43	28	467	~ 41	28	445	613	-	-	580	-	-
Stage 1	202	262	-	169	229	-	-	-	-	-	-	-
Stage 2	391	223	-	445	257	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	33	24	467	~ 33	24	445	613	-	-	580	-	-
Mov Cap-2 Maneuver	114	101	-	106	98	-	-	-	-	-	-	-
Stage 1	181	247	-	151	205	-	-	-	-	-	-	-
Stage 2	307	199	-	381	242	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	26.7	50.6	0.6	0.3
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	613	-	-	230	105	445	580	-	-
HCM Lane V/C Ratio	0.106	-	-	0.284	0.569	0.098	0.056	-	-
HCM Control Delay (s)	11.6	-	-	26.7	77.2	14	11.6	-	-
HCM Lane LOS	B	-	-	D	F	B	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1.1	2.7	0.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 with Traffic Signal AM Peak Conditions

Intersection	
Int Delay, s/veh	1.9

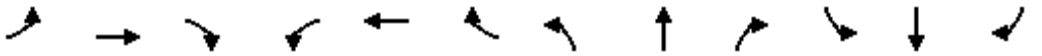
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	5	20	5	0	5	10	1080	0	10	1345	15
Future Vol, veh/h	35	5	20	5	0	5	10	1080	0	10	1345	15
Conflicting Peds, #/hr	4	0	0	0	0	4	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	5	22	5	0	5	11	1174	0	11	1462	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2108	2692	742	1953	2700	592	1481	0	0	1175	0	0
Stage 1	1495	1495	-	1197	1197	-	-	-	-	-	-	-
Stage 2	613	1197	-	756	1503	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 29	21	358	38	21	449	450	-	-	590	-	-
Stage 1	129	185	-	197	257	-	-	-	-	-	-	-
Stage 2	446	257	-	366	183	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 26	18	357	31	18	447	449	-	-	589	-	-
Mov Cap-2 Maneuver	96	97	-	118	94	-	-	-	-	-	-	-
Stage 1	126	165	-	192	251	-	-	-	-	-	-	-
Stage 2	428	251	-	297	163	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60	25.1	0.1	0.7
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	449	-	-	127	118	447	589	-	-
HCM Lane V/C Ratio	0.024	-	-	0.514	0.046	0.012	0.018	-	-
HCM Control Delay (s)	13.2	-	-	60	37	13.2	11.2	0.6	-
HCM Lane LOS	B	-	-	F	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4	0.1	0	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	100	10	0	20	30	1025	30	40	1260	55
Future Volume (veh/h)	55	5	100	10	0	20	30	1025	30	40	1260	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	60	5	47	11	0	1	33	1114	32	43	1370	58
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	14	59	173	0	147	50	2705	78	57	2677	113
Arrive On Green	0.09	0.09	0.09	0.09	0.00	0.09	0.03	0.77	0.77	0.03	0.77	0.77
Sat Flow, veh/h	725	147	631	1218	0	1575	1781	3527	101	1781	3473	147
Grp Volume(v), veh/h	112	0	0	11	0	1	33	561	585	43	700	728
Grp Sat Flow(s),veh/h/ln	1503	0	0	1218	0	1575	1781	1777	1852	1781	1777	1843
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.1	2.2	12.9	12.9	2.9	17.9	18.0
Cycle Q Clear(g_c), s	8.7	0.0	0.0	1.0	0.0	0.1	2.2	12.9	12.9	2.9	17.9	18.0
Prop In Lane	0.54		0.42	1.00		1.00	1.00		0.05	1.00		0.08
Lane Grp Cap(c), veh/h	186	0	0	173	0	147	50	1362	1420	57	1369	1421
V/C Ratio(X)	0.60	0.00	0.00	0.06	0.00	0.01	0.67	0.41	0.41	0.76	0.51	0.51
Avail Cap(c_a), veh/h	501	0	0	458	0	479	200	1362	1420	96	1369	1421
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.3	0.0	0.0	49.8	0.0	49.4	57.8	4.8	4.8	57.6	5.2	5.2
Incr Delay (d2), s/veh	3.1	0.0	0.0	0.2	0.0	0.0	14.3	0.9	0.9	18.7	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.0	0.3	0.0	0.0	1.2	4.2	4.3	1.6	5.8	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	56.4	0.0	0.0	50.0	0.0	49.4	72.1	5.7	5.7	76.3	6.6	6.5
LnGrp LOS	E	A	A	D	A	D	E	A	A	E	A	A
Approach Vol, veh/h		112			12			1179			1471	
Approach Delay, s/veh		56.4			49.9			7.5			8.6	
Approach LOS		E			D			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.3	96.5		15.2	7.8	97.0		15.2				
Change Period (Y+Rc), s	4.5	4.5		4.0	4.5	4.5		4.0				
Max Green Setting (Gmax), s	6.5	64.0		36.5	13.5	57.0		36.5				
Max Q Clear Time (g_c+I1), s	4.9	14.9		10.7	4.2	20.0		3.0				
Green Ext Time (p_c), s	0.0	9.6		0.6	0.0	13.2		0.0				

Intersection Summary												
HCM 6th Ctrl Delay			10.3									
HCM 6th LOS			B									

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 with Traffic Signal PM Peak Conditions

Intersection	
Int Delay, s/veh	1.6

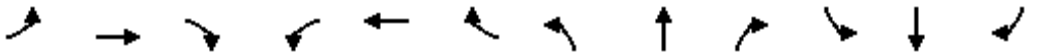
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	15	0	5	25	50	1435	5	15	1100	25
Future Vol, veh/h	20	5	15	0	5	25	50	1435	5	15	1100	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	16	0	5	27	54	1560	5	16	1196	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2133	2915	612	2304	2926	783	1223	0	0	1565	0	0
Stage 1	1242	1242	-	1671	1671	-	-	-	-	-	-	-
Stage 2	891	1673	-	633	1255	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	28	15	436	21	15	337	566	-	-	418	-	-
Stage 1	185	245	-	100	151	-	-	-	-	-	-	-
Stage 2	304	151	-	434	241	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 20	12	436	16	12	337	566	-	-	418	-	-
Mov Cap-2 Maneuver	97	76	-	69	72	-	-	-	-	-	-	-
Stage 1	167	215	-	91	137	-	-	-	-	-	-	-
Stage 2	243	137	-	358	212	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	45.6	23.7	0.4	1
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	566	-	-	131	72	337	418	-	-
HCM Lane V/C Ratio	0.096	-	-	0.332	0.075	0.081	0.039	-	-
HCM Control Delay (s)	12	-	-	45.6	59	16.6	14	0.8	-
HCM Lane LOS	B	-	-	E	F	C	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.3	0.2	0.3	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	0	40	20	0	25	85	1450	20	15	1055	45
Future Volume (veh/h)	25	0	40	20	0	25	85	1450	20	15	1055	45
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	27	0	0	22	0	1	92	1576	22	16	1147	47
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	98	0	0	127	0	62	116	2982	42	31	2725	112
Arrive On Green	0.04	0.00	0.00	0.04	0.00	0.04	0.07	0.83	0.83	0.02	0.78	0.78
Sat Flow, veh/h	982	0	0	1705	0	1585	1781	3588	50	1781	3479	143
Grp Volume(v), veh/h	27	0	0	22	0	1	92	780	818	16	586	608
Grp Sat Flow(s),veh/h/ln	982	0	0	1705	0	1585	1781	1777	1861	1781	1777	1845
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.1	6.1	15.8	15.9	1.1	12.8	12.8
Cycle Q Clear(g_c), s	3.7	0.0	0.0	1.4	0.0	0.1	6.1	15.8	15.9	1.1	12.8	12.8
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.03	1.00		0.08
Lane Grp Cap(c), veh/h	98	0	0	127	0	62	116	1477	1547	31	1392	1445
V/C Ratio(X)	0.27	0.00	0.00	0.17	0.00	0.02	0.79	0.53	0.53	0.52	0.42	0.42
Avail Cap(c_a), veh/h	468	0	0	497	0	476	200	1477	1547	96	1392	1445
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.9	0.0	0.0	56.1	0.0	55.4	55.3	3.1	3.1	58.5	4.2	4.2
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.6	0.0	0.1	11.5	1.4	1.3	13.0	0.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.7	0.0	0.0	3.1	4.4	4.6	0.6	4.2	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.4	0.0	0.0	56.7	0.0	55.5	66.8	4.4	4.4	71.5	5.1	5.1
LnGrp LOS	E	A	A	E	A	E	E	A	A	E	A	A
Approach Vol, veh/h		27			23			1690			1210	
Approach Delay, s/veh		59.4			56.7			7.8			6.0	
Approach LOS		E			E			A			A	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.6	104.2		9.2	12.3	98.5		9.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	6.5	64.0		36.0	13.5	57.0		36.0				
Max Q Clear Time (g_c+I1), s	3.1	17.9		5.7	8.1	14.8		3.4				
Green Ext Time (p_c), s	0.0	18.2		0.1	0.1	10.7		0.1				

Intersection Summary			
HCM 6th Ctrl Delay		7.9	
HCM 6th LOS		A	

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2040 with Traffic Signal Sat MD Peak Conditions

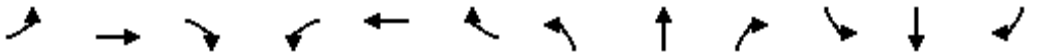
Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	20	5	5	30	20	1105	5	25	1030	30
Future Vol, veh/h	20	5	20	5	5	30	20	1105	5	25	1030	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	22	5	5	33	22	1201	5	27	1120	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1838	2441	577	1865	2455	603	1153	0	0	1206	0	0
Stage 1	1191	1191	-	1248	1248	-	-	-	-	-	-	-
Stage 2	647	1250	-	617	1207	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	47	31	460	45	30	442	602	-	-	574	-	-
Stage 1	199	259	-	183	243	-	-	-	-	-	-	-
Stage 2	426	243	-	444	254	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	37	26	460	36	25	442	602	-	-	574	-	-
Mov Cap-2 Maneuver	128	110	-	120	109	-	-	-	-	-	-	-
Stage 1	192	225	-	176	234	-	-	-	-	-	-	-
Stage 2	371	234	-	358	220	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.5	20.3	0.2	0.9
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	602	-	-	184	114	442	574	-	-
HCM Lane V/C Ratio	0.036	-	-	0.266	0.095	0.074	0.047	-	-
HCM Control Delay (s)	11.2	-	-	31.5	39.9	13.8	11.6	0.7	-
HCM Lane LOS	B	-	-	D	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1	0.3	0.2	0.1	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	40	50	5	40	60	1060	40	30	1010	30
Future Volume (veh/h)	20	0	40	50	5	40	60	1060	40	30	1010	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	22	0	0	54	5	4	65	1152	41	33	1098	32
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	454	0	0	469	41	482	84	1945	69	50	1891	55
Arrive On Green	0.30	0.00	0.00	0.30	0.30	0.30	0.05	0.56	0.56	0.03	0.54	0.54
Sat Flow, veh/h	1297	0	0	1352	135	1585	1781	3500	125	1781	3526	103
Grp Volume(v), veh/h	22	0	0	59	0	4	65	585	608	33	553	577
Grp Sat Flow(s),veh/h/ln	1297	0	0	1487	0	1585	1781	1777	1848	1781	1777	1852
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	0.2	4.3	26.2	26.2	2.2	25.2	25.2
Cycle Q Clear(g_c), s	4.2	0.0	0.0	2.8	0.0	0.2	4.3	26.2	26.2	2.2	25.2	25.2
Prop In Lane	1.00		0.00	0.92		1.00	1.00		0.07	1.00		0.06
Lane Grp Cap(c), veh/h	454	0	0	510	0	482	84	987	1027	50	953	993
V/C Ratio(X)	0.05	0.00	0.00	0.12	0.00	0.01	0.78	0.59	0.59	0.67	0.58	0.58
Avail Cap(c_a), veh/h	454	0	0	510	0	482	171	987	1027	111	953	993
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	0.0	0.0	30.0	0.0	29.1	56.6	17.7	17.7	57.8	18.7	18.7
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.5	0.0	0.0	14.1	2.6	2.5	14.3	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.0	1.3	0.0	0.1	2.3	10.9	11.3	1.2	10.6	11.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.8	0.0	0.0	30.5	0.0	29.2	70.6	20.3	20.2	72.1	21.3	21.2
LnGrp LOS	C	A	A	C	A	C	E	C	C	E	C	C
Approach Vol, veh/h		22			63			1258			1163	
Approach Delay, s/veh		31.8			30.4			22.8			22.7	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	71.2		41.0	10.1	68.9		41.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	62.5		36.5	11.5	58.5		36.5				
Max Q Clear Time (g_c+I1), s	4.2	28.2		6.2	6.3	27.2		4.8				
Green Ext Time (p_c), s	0.0	9.6		0.1	0.0	8.7		0.3				

Intersection Summary			
HCM 6th Ctrl Delay		23.0	
HCM 6th LOS		C	

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 without Traffic Signal AM Peak Conditions

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	5	20	6	0	6	10	1087	0	12	1352	15
Future Vol, veh/h	35	5	20	6	0	6	10	1087	0	12	1352	15
Conflicting Peds, #/hr	4	0	0	0	0	4	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	5	22	7	0	7	11	1182	0	13	1470	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2124	2712	746	1969	2720	596	1489	0	0	1183	0	0
Stage 1	1507	1507	-	1205	1205	-	-	-	-	-	-	-
Stage 2	617	1205	-	764	1515	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 28	21	356	37	20	447	447	-	-	586	-	-
Stage 1	127	182	-	195	255	-	-	-	-	-	-	-
Stage 2	444	255	-	362	180	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 24	18	355	29	17	445	446	-	-	585	-	-
Mov Cap-2 Maneuver	95	94	-	115	91	-	-	-	-	-	-	-
Stage 1	124	158	-	190	248	-	-	-	-	-	-	-
Stage 2	425	248	-	286	156	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.8	25.7	0.1	0.8
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	446	-	-	126	115	445	585	-	-
HCM Lane V/C Ratio	0.024	-	-	0.518	0.057	0.015	0.022	-	-
HCM Control Delay (s)	13.3	-	-	60.8	38.2	13.2	11.3	0.7	-
HCM Lane LOS	B	-	-	F	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4	0.2	0	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	55	5	100	12	0	27	30	1025	35	47	1261	55
Future Vol, veh/h	55	5	100	12	0	27	30	1025	35	47	1261	55
Conflicting Peds, #/hr	2	0	0	0	0	2	2	0	6	6	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	60	5	109	13	0	29	33	1114	38	51	1371	60

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2130	2729	718	1995	2740	584	1433	0	0	1158	0	0
Stage 1	1505	1505	-	1205	1205	-	-	-	-	-	-	-
Stage 2	625	1224	-	790	1535	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 28	20	371	36	20	455	470	-	-	599	-	-
Stage 1	127	182	-	195	255	-	-	-	-	-	-	-
Stage 2	439	250	-	350	176	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 23	17	370	21	17	452	469	-	-	596	-	-
Mov Cap-2 Maneuver	87	87	-	93	83	-	-	-	-	-	-	-
Stage 1	118	166	-	180	236	-	-	-	-	-	-	-
Stage 2	381	231	-	219	161	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	136.8	24.7	0.4	0.4
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	469	-	-	167	93	452	596	-	-
HCM Lane V/C Ratio	0.07	-	-	1.041	0.14	0.065	0.086	-	-
HCM Control Delay (s)	13.2	-	-	136.8	49.9	13.5	11.6	-	-
HCM Lane LOS	B	-	-	F	E	B	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	8.5	0.5	0.2	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 without Traffic Signal PM Peak Conditions

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	15	0	5	28	50	1438	7	19	1106	25
Future Vol, veh/h	20	5	15	0	5	28	50	1438	7	19	1106	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	16	0	5	30	54	1563	8	21	1202	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2150	2937	615	2321	2946	786	1229	0	0	1571	0	0
Stage 1	1258	1258	-	1675	1675	-	-	-	-	-	-	-
Stage 2	892	1679	-	646	1271	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	27	15	434	20	15	335	563	-	-	416	-	-
Stage 1	181	241	-	99	150	-	-	-	-	-	-	-
Stage 2	303	150	-	427	237	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	11	434	15	11	335	563	-	-	416	-	-
Mov Cap-2 Maneuver	94	72	-	67	69	-	-	-	-	-	-	-
Stage 1	164	202	-	89	136	-	-	-	-	-	-	-
Stage 2	239	136	-	336	199	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	47.9	23.6	0.4	1.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	563	-	-	126	69	335	416	-	-
HCM Lane V/C Ratio	0.097	-	-	0.345	0.079	0.091	0.05	-	-
HCM Control Delay (s)	12.1	-	-	47.9	61.6	16.8	14.1	1.1	-
HCM Lane LOS	B	-	-	E	F	C	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.4	0.2	0.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	0	40	22	0	28	85	1452	27	21	1055	45
Future Vol, veh/h	25	0	40	22	0	28	85	1452	27	21	1055	45
Conflicting Peds, #/hr	2	0	0	0	0	2	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	27	0	43	24	0	30	92	1578	29	23	1147	49

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2194	3010	599	2397	3020	806	1197	0	0	1607	0	0
Stage 1	1219	1219	-	1777	1777	-	-	-	-	-	-	-
Stage 2	975	1791	-	620	1243	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 25	13	445	~ 18	13	325	579	-	-	403	-	-
Stage 1	191	251	-	85	134	-	-	-	-	-	-	-
Stage 2	270	132	-	442	245	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	10	445	~ 14	10	324	578	-	-	403	-	-
Mov Cap-2 Maneuver	86	62	-	56	61	-	-	-	-	-	-	-
Stage 1	160	236	-	71	113	-	-	-	-	-	-	-
Stage 2	205	111	-	376	231	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	40.1	58.4	0.7	0.3
HCM LOS	E	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	578	-	-	171	56	324	403	-	-
HCM Lane V/C Ratio	0.16	-	-	0.413	0.427	0.094	0.057	-	-
HCM Control Delay (s)	12.4	-	-	40.1	110.6	17.3	14.5	-	-
HCM Lane LOS	B	-	-	E	F	C	B	-	-
HCM 95th %tile Q(veh)	0.6	-	-	1.8	1.6	0.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 without Traffic Signal Sat MD Peak Conditions

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	20	7	5	40	20	1118	6	32	1040	30
Future Vol, veh/h	20	5	20	7	5	40	20	1118	6	32	1040	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	22	8	5	43	22	1215	7	35	1130	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1871	2483	582	1901	2496	611	1163	0	0	1222	0	0
Stage 1	1217	1217	-	1263	1263	-	-	-	-	-	-	-
Stage 2	654	1266	-	638	1233	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	44	29	456	42	29	437	596	-	-	566	-	-
Stage 1	192	252	-	180	239	-	-	-	-	-	-	-
Stage 2	422	238	-	431	247	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	23	456	32	23	437	596	-	-	566	-	-
Mov Cap-2 Maneuver	121	102	-	114	103	-	-	-	-	-	-	-
Stage 1	185	207	-	173	230	-	-	-	-	-	-	-
Stage 2	357	229	-	329	203	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.6	20.7	0.2	1.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	596	-	-	174	109	437	566	-	-
HCM Lane V/C Ratio	0.036	-	-	0.281	0.12	0.099	0.061	-	-
HCM Control Delay (s)	11.3	-	-	33.6	42.5	14.1	11.8	1	-
HCM Lane LOS	B	-	-	D	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.4	0.3	0.2	-	-

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	0	40	66	5	53	60	1061	52	40	1012	30
Future Vol, veh/h	20	0	40	66	5	53	60	1061	52	40	1012	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	541	-	-	171	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	0	43	72	5	58	65	1153	57	43	1100	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1912	2543	567	1948	2531	605	1133	0	0	1210	0	0
Stage 1	1203	1203	-	1312	1312	-	-	-	-	-	-	-
Stage 2	709	1340	-	636	1219	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	41	27	467	~ 39	27	441	612	-	-	572	-	-
Stage 1	196	256	-	167	227	-	-	-	-	-	-	-
Stage 2	391	220	-	433	251	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	30	22	467	~ 31	22	441	612	-	-	572	-	-
Mov Cap-2 Maneuver	108	95	-	103	94	-	-	-	-	-	-	-
Stage 1	175	237	-	149	203	-	-	-	-	-	-	-
Stage 2	296	197	-	363	232	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	27.8	68.1	0.6	0.4
HCM LOS	D	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	612	-	-	222	102	441	572	-	-
HCM Lane V/C Ratio	0.107	-	-	0.294	0.757	0.131	0.076	-	-
HCM Control Delay (s)	11.6	-	-	27.8	108.1	14.4	11.8	-	-
HCM Lane LOS	B	-	-	D	F	B	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	1.2	4	0.4	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 with Traffic Signal AM Peak Conditions

Intersection	
Int Delay, s/veh	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	35	5	20	6	0	6	10	1087	0	12	1352	15
Future Vol, veh/h	35	5	20	6	0	6	10	1087	0	12	1352	15
Conflicting Peds, #/hr	4	0	0	0	0	4	3	0	1	1	0	3
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	38	5	22	7	0	7	11	1182	0	13	1470	16

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2124	2712	746	1969	2720	596	1489	0	0	1183	0	0
Stage 1	1507	1507	-	1205	1205	-	-	-	-	-	-	-
Stage 2	617	1205	-	764	1515	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 28	21	356	37	20	447	447	-	-	586	-	-
Stage 1	127	182	-	195	255	-	-	-	-	-	-	-
Stage 2	444	255	-	362	180	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 24	18	355	29	17	445	446	-	-	585	-	-
Mov Cap-2 Maneuver	95	94	-	115	91	-	-	-	-	-	-	-
Stage 1	124	158	-	190	248	-	-	-	-	-	-	-
Stage 2	425	248	-	286	156	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	60.8	25.7	0.1	0.8
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	446	-	-	126	115	445	585	-	-
HCM Lane V/C Ratio	0.024	-	-	0.518	0.057	0.015	0.022	-	-
HCM Control Delay (s)	13.3	-	-	60.8	38.2	13.2	11.3	0.7	-
HCM Lane LOS	B	-	-	F	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.4	0.2	0	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	55	5	100	12	0	27	30	1025	35	47	1261	55
Future Volume (veh/h)	55	5	100	12	0	27	30	1025	35	47	1261	55
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.99		0.99	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	60	5	47	13	0	8	33	1114	37	51	1371	58
Adj No. of Lanes	0	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	113	14	59	175	0	150	49	2655	88	66	2660	112
Arrive On Green	0.10	0.10	0.10	0.10	0.00	0.10	0.03	0.76	0.76	0.04	0.77	0.77
Sat Flow, veh/h	708	148	620	1207	0	1573	1774	3495	116	1774	3460	146
Grp Volume(v), veh/h	112	0	0	13	0	8	33	564	587	51	700	729
Grp Sat Flow(s),veh/h/ln	1477	0	0	1207	0	1573	1774	1770	1842	1774	1770	1836
Q Serve(g_s), s	7.7	0.0	0.0	0.0	0.0	0.6	2.2	13.5	13.5	3.4	18.2	18.3
Cycle Q Clear(g_c), s	8.9	0.0	0.0	1.2	0.0	0.6	2.2	13.5	13.5	3.4	18.2	18.3
Prop In Lane	0.54		0.42	1.00		1.00	1.00		0.06	1.00		0.08
Lane Grp Cap(c), veh/h	186	0	0	175	0	150	49	1344	1399	66	1361	1412
V/C Ratio(X)	0.60	0.00	0.00	0.07	0.00	0.05	0.67	0.42	0.42	0.78	0.51	0.52
Avail Cap(c_a), veh/h	496	0	0	455	0	479	200	1344	1399	96	1361	1412
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.2	0.0	0.0	49.7	0.0	49.4	57.8	5.1	5.1	57.3	5.3	5.3
Incr Delay (d2), s/veh	3.1	0.0	0.0	0.2	0.0	0.1	14.5	1.0	0.9	21.0	1.4	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.8	0.0	0.0	0.4	0.0	0.2	1.3	6.8	7.0	2.1	9.3	9.6
LnGrp Delay(d),s/veh	56.3	0.0	0.0	49.9	0.0	49.5	72.3	6.1	6.0	78.3	6.7	6.7
LnGrp LOS	E			D		D	E	A	A	E	A	A
Approach Vol, veh/h		112			21			1184			1480	
Approach Delay, s/veh		56.3			49.7			7.9			9.1	
Approach LOS		E			D			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.9	95.7		15.4	7.8	96.8		15.4
Change Period (Y+Rc), s	4.5	4.5		4.0	4.5	4.5		4.0
Max Green Setting (Gmax), s	6.5	64.0		36.5	13.5	57.0		36.5
Max Q Clear Time (g_c+I1), s	5.4	15.5		10.9	4.2	20.3		3.2
Green Ext Time (p_c), s	0.0	9.7		0.6	0.0	13.2		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	10.8
HCM 2010 LOS	B

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 with Traffic Signal PM Peak Conditions

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	15	0	5	28	50	1438	7	19	1106	25
Future Vol, veh/h	20	5	15	0	5	28	50	1438	7	19	1106	25
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	16	0	5	30	54	1563	8	21	1202	27

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2150	2937	615	2321	2946	786	1229	0	0	1571	0	0
Stage 1	1258	1258	-	1675	1675	-	-	-	-	-	-	-
Stage 2	892	1679	-	646	1271	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	27	15	434	20	15	335	563	-	-	416	-	-
Stage 1	181	241	-	99	150	-	-	-	-	-	-	-
Stage 2	303	150	-	427	237	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 19	11	434	15	11	335	563	-	-	416	-	-
Mov Cap-2 Maneuver	94	72	-	67	69	-	-	-	-	-	-	-
Stage 1	164	202	-	89	136	-	-	-	-	-	-	-
Stage 2	239	136	-	336	199	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	47.9	23.6	0.4	1.3
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	563	-	-	126	69	335	416	-	-
HCM Lane V/C Ratio	0.097	-	-	0.345	0.079	0.091	0.05	-	-
HCM Control Delay (s)	12.1	-	-	47.9	61.6	16.8	14.1	1.1	-
HCM Lane LOS	B	-	-	E	F	C	B	A	-
HCM 95th %tile Q(veh)	0.3	-	-	1.4	0.2	0.3	0.2	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	0	40	22	0	28	85	1452	27	21	1055	45
Future Volume (veh/h)	25	0	40	22	0	28	85	1452	27	21	1055	45
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	27	0	0	24	0	3	92	1578	29	23	1147	47
Adj No. of Lanes	0	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	100	0	0	130	0	65	116	2929	54	40	2706	111
Arrive On Green	0.04	0.00	0.00	0.04	0.00	0.04	0.07	0.82	0.82	0.02	0.78	0.78
Sat Flow, veh/h	960	0	0	1693	0	1583	1774	3556	65	1774	3465	142
Grp Volume(v), veh/h	27	0	0	24	0	3	92	784	823	23	586	608
Grp Sat Flow(s),veh/h/ln	960	0	0	1693	0	1583	1774	1770	1851	1774	1770	1838
Q Serve(g_s), s	2.3	0.0	0.0	0.0	0.0	0.2	6.1	16.8	16.9	1.5	13.0	13.0
Cycle Q Clear(g_c), s	3.9	0.0	0.0	1.6	0.0	0.2	6.1	16.8	16.9	1.5	13.0	13.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		0.04	1.00		0.08
Lane Grp Cap(c), veh/h	100	0	0	130	0	65	116	1458	1525	40	1382	1435
V/C Ratio(X)	0.27	0.00	0.00	0.18	0.00	0.05	0.79	0.54	0.54	0.58	0.42	0.42
Avail Cap(c_a), veh/h	464	0	0	495	0	475	200	1458	1525	96	1382	1435
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.8	0.0	0.0	55.9	0.0	55.2	55.3	3.3	3.4	58.1	4.3	4.3
Incr Delay (d2), s/veh	1.4	0.0	0.0	0.7	0.0	0.3	11.6	1.4	1.4	12.8	1.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.8	0.0	0.1	3.4	8.6	9.0	0.9	6.5	6.8
LnGrp Delay(d),s/veh	59.2	0.0	0.0	56.6	0.0	55.5	66.8	4.8	4.7	70.9	5.3	5.2
LnGrp LOS	E			E		E	E	A	A	E	A	A
Approach Vol, veh/h		27			27			1699			1217	
Approach Delay, s/veh		59.2			56.5			8.1			6.5	
Approach LOS		E			E			A			A	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.2	103.4		9.5	12.3	98.2		9.5
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	6.5	64.0		36.0	13.5	57.0		36.0
Max Q Clear Time (g_c+I1), s	3.5	18.9		5.9	8.1	15.0		3.6
Green Ext Time (p_c), s	0.0	18.3		0.1	0.1	10.7		0.1

Intersection Summary	
HCM 2010 Ctrl Delay	8.3
HCM 2010 LOS	A

APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Future Year 2040 with Traffic Signal Sat MD Peak Conditions

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	20	5	20	7	5	40	20	1118	6	32	1040	30
Future Vol, veh/h	20	5	20	7	5	40	20	1118	6	32	1040	30
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	150	150	-	-	-	-	-
Veh in Median Storage, #	-	1	-	-	1	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	22	5	22	8	5	43	22	1215	7	35	1130	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1871	2483	582	1901	2496	611	1163	0	0	1222	0	0
Stage 1	1217	1217	-	1263	1263	-	-	-	-	-	-	-
Stage 2	654	1266	-	638	1233	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	44	29	456	42	29	437	596	-	-	566	-	-
Stage 1	192	252	-	180	239	-	-	-	-	-	-	-
Stage 2	422	238	-	431	247	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	32	23	456	32	23	437	596	-	-	566	-	-
Mov Cap-2 Maneuver	121	102	-	114	103	-	-	-	-	-	-	-
Stage 1	185	207	-	173	230	-	-	-	-	-	-	-
Stage 2	357	229	-	329	203	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	33.6	20.7	0.2	1.3
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	596	-	-	174	109	437	566	-	-
HCM Lane V/C Ratio	0.036	-	-	0.281	0.12	0.099	0.061	-	-
HCM Control Delay (s)	11.3	-	-	33.6	42.5	14.1	11.8	1	-
HCM Lane LOS	B	-	-	D	E	B	B	A	-
HCM 95th %tile Q(veh)	0.1	-	-	1.1	0.4	0.3	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	0	40	66	5	53	60	1061	52	40	1012	30
Future Volume (veh/h)	20	0	40	66	5	53	60	1061	52	40	1012	30
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1900	1863	1900	1900	1863	1863	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	22	0	0	72	5	19	65	1153	55	43	1100	31
Adj No. of Lanes	0	1	0	0	1	1	1	2	0	1	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	437	0	0	478	31	482	84	1897	90	56	1885	53
Arrive On Green	0.30	0.00	0.00	0.30	0.30	0.30	0.05	0.55	0.55	0.03	0.54	0.54
Sat Flow, veh/h	1239	0	0	1381	103	1583	1774	3439	164	1774	3516	99
Grp Volume(v), veh/h	22	0	0	77	0	19	65	593	615	43	554	577
Grp Sat Flow(s),veh/h/ln	1239	0	0	1484	0	1583	1774	1770	1834	1774	1770	1845
Q Serve(g_s), s	1.4	0.0	0.0	0.0	0.0	1.0	4.3	27.1	27.2	2.9	25.3	25.3
Cycle Q Clear(g_c), s	5.2	0.0	0.0	3.8	0.0	1.0	4.3	27.1	27.2	2.9	25.3	25.3
Prop In Lane	1.00		0.00	0.94		1.00	1.00		0.09	1.00		0.05
Lane Grp Cap(c), veh/h	437	0	0	509	0	482	84	976	1012	56	949	989
V/C Ratio(X)	0.05	0.00	0.00	0.15	0.00	0.04	0.78	0.61	0.61	0.76	0.58	0.58
Avail Cap(c_a), veh/h	437	0	0	509	0	482	170	976	1012	111	949	989
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.2	0.0	0.0	30.4	0.0	29.4	56.5	18.1	18.2	57.7	18.8	18.8
Incr Delay (d2), s/veh	0.2	0.0	0.0	0.6	0.0	0.2	14.2	2.8	2.7	19.0	2.6	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.0	1.9	0.0	0.5	2.5	13.9	14.4	1.7	13.0	13.5
LnGrp Delay(d),s/veh	32.5	0.0	0.0	31.0	0.0	29.6	70.7	21.0	20.9	76.6	21.4	21.3
LnGrp LOS	C			C		C	E	C	C	E	C	C
Approach Vol, veh/h		22			96			1273			1174	
Approach Delay, s/veh		32.5			30.7			23.5			23.4	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	8.3	70.7		41.0	10.2	68.8		41.0
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s	7.5	62.5		36.5	11.5	58.5		36.5
Max Q Clear Time (g_c+I1), s	4.9	29.2		7.2	6.3	27.3		5.8
Green Ext Time (p_c), s	0.0	9.8		0.1	0.0	8.7		0.5

Intersection Summary	
HCM 2010 Ctrl Delay	23.8
HCM 2010 LOS	C