Draft Supplemental Environmental Assessment Of Traffic Impacts and Anticipated Finding of No Significant Impact for the 2025 Master Plan Improvements at Kahului Commercial Harbor District of Wailuku, County of Maui

TMK: 3-7-01: 21 & 22; 3-7-10: 2, 3, 6, 13, 15, 21, 22, 24, 26, 27, 28, 30, 32 & 34; and 3-7-08: 2, 3, 4 & 6

Proposing Agency:
State of Hawaii
Department of Transportation
Harbors Division
79 South Nimitz Highway
Honolulu, Hawaii 96813

Responsible Official: _____ 2-8-08
BRENNON T. MORIOKA, Ph.D., P.E. Date
Interim Director of Transportation

Prepared by:
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

February 12, 2008

This document is prepared pursuant to Chapter 343, HRS, and Administrative Rules, Title 11, Chapter 200, of the Department of Health

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Chapter 1
Purpose and Need

1.1 Introduction and Background

This supplemental environmental assessment (EA) is prepared in accordance with Chapter 343, Hawaii Revised Statutes (HRS), to evaluate potential traffic impacts of improvements to Kahului Commercial Harbor on the Island of Maui. The subject improvements were evaluated in the *Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvements, Kahului Commercial Harbor* (2025 Master Plan EA), dated November 2005 and signed by the Deputy Director of Harbors, State of Hawaii Department of Transportation (DOT), on November 28, 2005. The Final EA and Finding of No Significant Impact (FONSI) covered short-term harbor improvements presented in the *Kahului Commercial Harbor 2025 Master Plan*, completed in September 2000.

Maui Tomorrow Foundation, Inc., Friends of Haleakala National Park, Inc., and the Kahului Harbor Coalition filed suit in the Circuit Court of the Second Circuit, challenging the State DOT's FONSI determination. The County of Maui filed as an intervenor in the lawsuit.

On July 9, 2007, the Court entered an order granting, in part, motions for summary judgment determining that the Final EA for the Kahului Commercial Harbor 2025 Master Plan improvements was "inadequate with respect to the subject matter of traffic impacts." The Court vacated the Finding of No Significant Impact published in The Environmental Notice on December 23, 2005, with respect to the subject matter of traffic impacts only.

After an evidentiary hearing on remedies held on August 2, 2007, the Court referred the subject EA back to the DOT for the preparation of a Supplemental Environmental Assessment as to traffic only and ordered the DOT to comply with the notice, publishing, and comment requirements as set out in HRS § 343-5. The Court affirmed that the subject FONSI was adequate with respect to all other subject matters other than the subject matter of traffic impacts.

1.2 Purpose and Scope of this Document

The purpose of this document is to comply with the above referenced order of the Court to prepare a supplemental EA addressing traffic impacts associated with the projects proposed in the 2025 Master Plan EA. These projects are listed in section 1.3 below and described in more detail in Chapter 2.

1.3 Proposed Action and Alternatives

The *Kahului Commercial Harbor 2025 Master Plan* was prepared to serve as a guide for development, maintenance, and enhancement of the Island of Maui's only commercial port. DOT's commercial harbor master plans have 20- to 25-year planning horizons and are typically updated every five years. Short-, intermediate-, and long-range projects were identified in the 2025 Master Plan. The DOT Harbors Division decided to undertake those improvements necessary within the short term (next 10 years) to ensure efficient, safe, accessible, and economical operations at Kahului Commercial Harbor. Those short-term improvements comprised the preferred alternative or proposed action in the 2025 Master Plan EA and are the subject of this supplemental EA. The short-term improvements are:

- Pier 1D (Pier 1 extension);
- Pier 1 waterline;
- New Pier 4 (angled configuration), which may be constructed in phases as funds become available; and
- Structural pavement, access bridge, and utilities at "Puʻunēnē Yard."

In addition, the 2025 Master Plan EA included an alternative to the new Pier 4 with angled configuration. Instead of the angled configuration, this alternative would involve expansion/extension of the existing Pier 3 to create a linear Pier 3 and Pier 4.

Another short-term project—Pier 1 comfort stations and sewer line—was identified in the 2025 Master Plan but declared exempt from Chapter 343 review.[1] It is not evaluated in this supplemental EA. The Pier 1 waterline project listed above is intended to serve the renovated comfort stations.

The Pier 1 waterline is currently in design. The Puʻunēnē storage yard improvements were completed in September 2007.

In accordance with Chapter 343, HRS, the 2025 Master Plan EA considered the no-action alternative. The no-action alternative is evaluated in this supplemental EA.

1.4 Need for the Project

The overall objectives of the *Kahului Commercial Harbor 2025 Master Plan* were to:

[1]This project allowed for closure of the harbor's cesspools to meet federal requirements. DOT Harbors Division determined that the project was in Exemption Class #2: Replacement or reconstruction of existing structure and facilities where the new structure will be located generally on the same site and will have substantially the same purpose, capacity, density, height, and dimensions as the structure replaced.

- Plan the proper development of Kahului Commercial Harbor, thereby facilitating maritime shipments of the essential commodities required by Maui's citizenry;

- Optimize the utilization of land and water resources committed to marine cargo and passenger operations in an economically responsible manner;

- Provide terminal, other harbor resources, and access to these facilities in locations within Kahului Bay and other locations in a manner that best relates to and serves Maui in an efficient, safe, and secure manner; and

- Minimize the impact on environmental quality and recreational opportunities contiguous with Maui's port facilities.

The 2025 Master Plan EA was limited to evaluating improvements that could be implemented within the foreseeable future—roughly a 10-year timeframe. The projects listed in the previous section were identified as meeting immediate facility needs at the port to accommodate projected cargo and passenger demands.

The 2025 Master Plan included an analysis of berthing space requirements at Kahului Commercial Harbor based on forecast ship arrivals (both cargo and passenger) and overall ship lengths. Assumptions were made as to the use of piers by specific types of vessels. However, the berths at Kahului and throughout the state are generally common use, with piers planned and designed to accommodate various vessel types to the extent practical. This provides maximum flexibility to the harbor master in meeting maritime demand.

The berthing space analysis indicated that all four piers at Kahului Commercial Harbor would be more than fully utilized in 2025. Projected berth utilization factors are shown in the following table. Berth utilization factors of 0.5 (for unscheduled calls) and 0.6 (for scheduled calls) indicate that the berth is fully utilized or approximately filled one-half of the time. The 0.5 berth utilization factor accounts for the difficulty for vessels to maintain an accurate schedule due to rough seas, delays at other ports, etc.

TABLE 1
BERTHING SPACE ANALYSIS

Pier	Users	Utilization Factor
1	Sugar, coal, tinplate, sand, lumber, scrap metal, liquid fertilizer, cruise ships, overseas container operations	1.19
2	Inter-island cargo, liquefied petroleum gas (propane) operations, vessels awaiting permanent berths, tugs, other users	1.01
3	Cement and petroleum products	1.00
4	Liquid-bulk and other cargo vessels, inter/intra–island ferries, tugs, other users	2.07

The 2025 Master Plan also included an analysis of container storage yard space requirements to accommodate projected cargo volumes. The analysis was based on a standardized 20-foot-long container—20-foot-equivalent units or TEU. Therefore, a 20-foot-long container is represented as one TEU, a 24-foot-long container is equivalent to 1.2 TEU, a 40-foot-long container is equivalent to 2 TEUs, and so forth. The number of TEUs can be translated to projected storage volumes and areas. By applying commonly used port planning formulae, the following spatial requirements for projected cargo volumes were determined:

- Pier 1 overseas cargo will require container yard space of 21 acres by 2025 (15.9 acres are currently available). Based on projected cargo volumes and existing available space, the Pier 1 container yard was projected to be at capacity by 2005.

- Pier 2 inter-island cargo will require container yard space of 24 acres by 2025 (17.6 acres were available when the analysis was done). The Pier 2 yard was near capacity at the time of the master plan analysis (2000).

- Additional overflow space of 3.7 acres, located at the corner of Hobron Avenue and Ka‘ahumanu Avenue, is used for automobile storage. Additional capacity provided by this overflow space would delay the need for more container storage space until 2008.

1.5 Other Environmental Documents

The short-term harbor improvements, some of which have already been constructed (see section 1.3 above), are included in two environmental impact statements being prepared by DOT. One is the *Kahului Commercial Harbor 2030 Master Plan and Draft Environmental Impact Statement* (2030 EIS) (December 2007). The projects that comprise the proposed action in the 2025 Master Plan EA are considered part of the existing conditions for the purposes of the 2030 environmental impact statement (EIS) evaluation. The traffic analysis conducted for the 2030 EIS—specifically, traffic conditions projected under the no-action or without-project alternative—was used in the traffic analysis presented in this supplemental EA.

The second document is an EIS being prepared by DOT Harbors Division in accordance with Act 2, passed in Special Session of the Hawaii State Legislature and signed by Governor Lingle on November 4, 2007. Act 2 mandates preparation of an EIS “regarding commercial harbor improvements undertaken to accommodate a large capacity ferry vessel company and its operations.” That EIS will analyze impacts of the barge located at the end of Pier 2 at Kahului Commercial Harbor, as well as facilities constructed/installed at other ports to accommodate inter-island ferry operations. Similar to the 2030 EIS, the 2025 short-term harbor improvements are considered part of existing conditions.

Chapter 2
Proposed Action and Alternatives

2.1 Proposed Action (Preferred Alternative)

The State Department of Transportation (DOT) Harbors Division proposed the following short-term improvements on the east side of Kahului Commercial Harbor, which comprised the preferred alternative in the *Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvements, Kahului Commercial Harbor* (2025 Master Plan EA) (see Figure 1). These projects would help meet the need for additional berthing and storage space identified in Chapter 1.

- Pier 1D. Pier 1D is an extension of Pier 1 toward the west. It consists of a series of mooring/breasting dolphins extending about 500 feet from the end of Pier 1C. The dolphins are spaced at approximately 100-foot intervals with catwalks/ramps connecting each dolphin. A dolphin typically consists of a mooring bollard supported by concrete piles. The catwalks/ramps, about six feet wide and pile supported, provide access to the mooring bollards.

- Pier 1 Waterline. This waterline serves the expanded and renovated Pier 1 shed comfort stations. (The comfort station expansion/renovation is an exempt project, as explained in Chapter 1, involving closure of cesspools and installation of a sewer line connection to the County sewer system on Wharf Street.)

- New Pier 4, Angled. This project provides a new pier structure from the existing north corner of Pier 3 to Pier 1 at about a 30-degree angle. Piers of this type are typically supported on piles and/or bulkheads with fill. If pile supports are used, pile spacings would be about 8 to 12 feet in the longitudinal direction and approximately 20 to 25 feet in the lateral direction. Rip-rap under the pier would provide erosion protection along the shoreline. Pile spacings are dependent on various factors such as soil conditions, pier loads, and pile size. Elevation of the new Pier 4 would match the existing Pier 3 elevation. Pier 4 would provide for off-loading of liquid-bulk cargo, roll-on/roll-off needs of vessels, intra- and inter-island ferries, tugs, and other users. In addition to the berthing structures, this project would include associated improvements such as ramps, bollards, transmission pipelines, utilities, pavement striping, lighting, and other support facilities.

  Pier 4 and associated improvements may be constructed in phases with the ultimate configuration as described here (preferred) or a linear Piers 3 and 4 alternative as described in section 2.2 below. The Pier 4 project would include improvements to facilitate loading and unloading of cargo and

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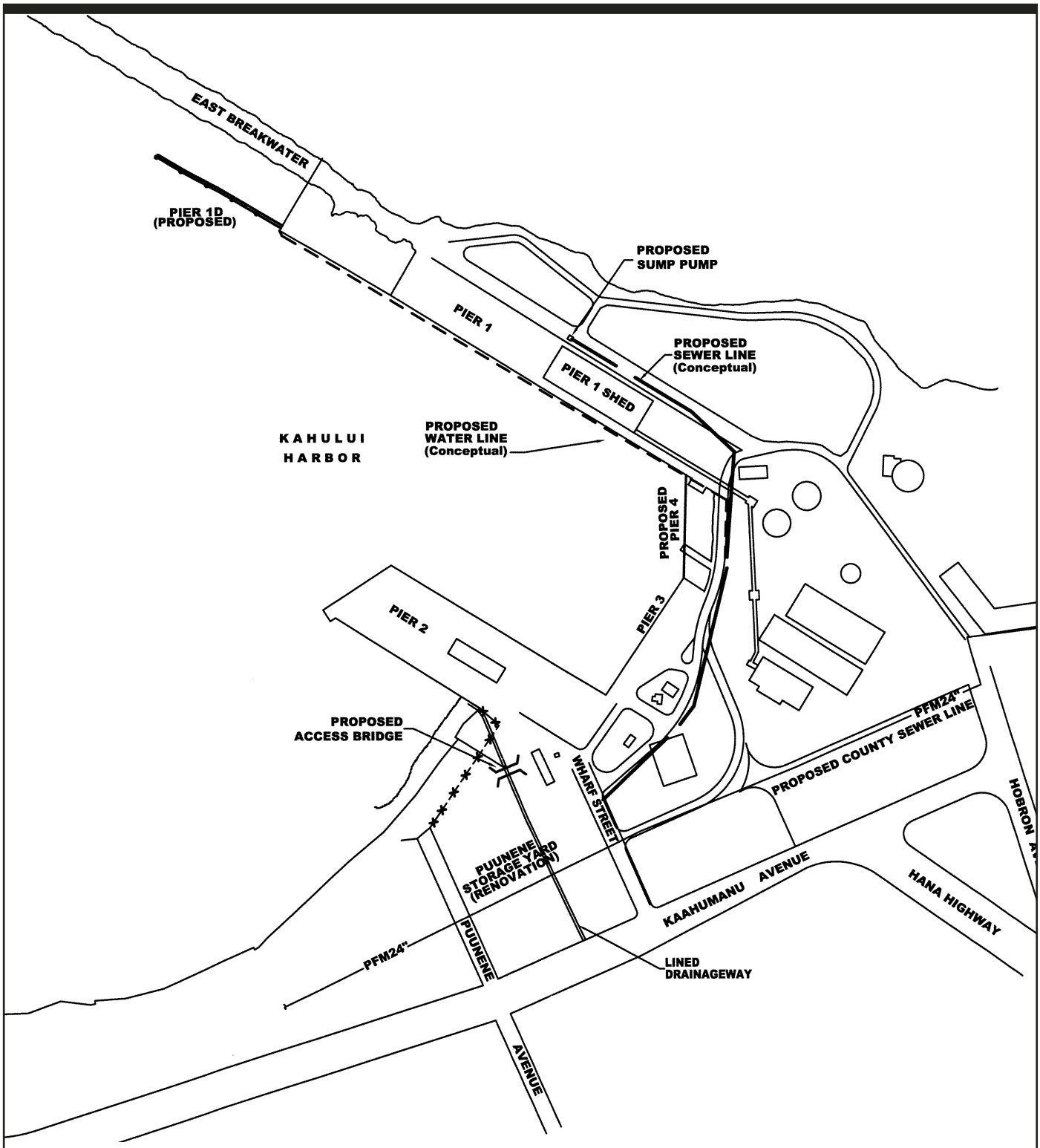

Source: Edward K. Noda and Associates, Inc. January 2005. Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvements, Kahului Commercial Harbor. State of Hawaii, Department of Transportation.

Figure 1
PROPOSED IMPROVEMENTS—PREFERRED ALTERNATIVE

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passengers. Due to funding constraints, the initial construction phase may be smaller than the proposed Pier 4 development described here, and may use mooring/breasting dolphins, linear pier, finger pier, or other types of moorings between the existing Pier 1 and Pier 3. The pier would be constructed on bulkheads with fill and/or on piles, depending on cost and substrate type. As part of the construction, the area fronting Piers 3 and 4 would be dredged to a depth of 30 to 35 feet. This area is outside of the "federal project limits" (i.e., area of the harbor basin dredged and maintained by the U.S. Army of Corps of Engineers). If suitable, dredge material may be used as fill for the construction of Pier 4.

- Structural Pavement, Access Bridge, and Utilities at "Puʻunēnē Yard." This project includes the demolition of existing pavement and construction of structural pavement, drainage infrastructure, fire-suppression infrastructure, and a new access bridge connecting the Puʻunene Yard to Pier 2. A portion of the pavement, about 200 feet on the north end of the yard and bridge, is designed for high-capacity loads for heavy-lift operations, such as the Hyster 920 or Cat 925. Pavement for the remaining portion of the yard is designed to store automobiles and containers on chassis. Infrastructure improvements include drainage lines, fire protection lines, and electrical ducts. The bridge is constructed over the existing open drainage way.

2.2 Other Action Alternative – Piers 3 and 4, Linear

The 2025 Master Plan EA considered an alternative to the angled Pier 4 described above. This alternative would provide approximately 800 feet of linear pier area by expanding the Pier 3 apron seaward by about 60 feet and constructing a new linear Pier 4 (see Figure 2). In addition, new fuel transmission pipelines for off-loading of liquid-bulk cargos, as well as waterlines for firefighting, would be installed. As with the preferred alternative, the extension of Pier 3 and the new Pier 4 would be supported on piles and/or bulkheads with fill. Typical pier design calls for pile spacing from 8 to 12 feet in a longitudinal direction and from 20 to 25 feet in a lateral direction. Pile spacings would be determined in the design process, depending on factors such as soil conditions, pier loads, and pile size. Rip-rap protection would be laid under the piers and along the shoreline for erosion protection.

Pier 4 would facilitate loading and unloading of the same cargo and passenger types as the preferred alternative. In addition to berthing structures, the project would include ramps, bollards, transmission pipelines, utilities, paving, pavement striping, lighting, etc. to accommodate various users.

Due to funding constraints, the initial construction phase may be smaller in scale and involve using mooring/breasting dolphins, linear pier, finger pier, or other types of moorings between the existing Pier 1 and Pier 3.

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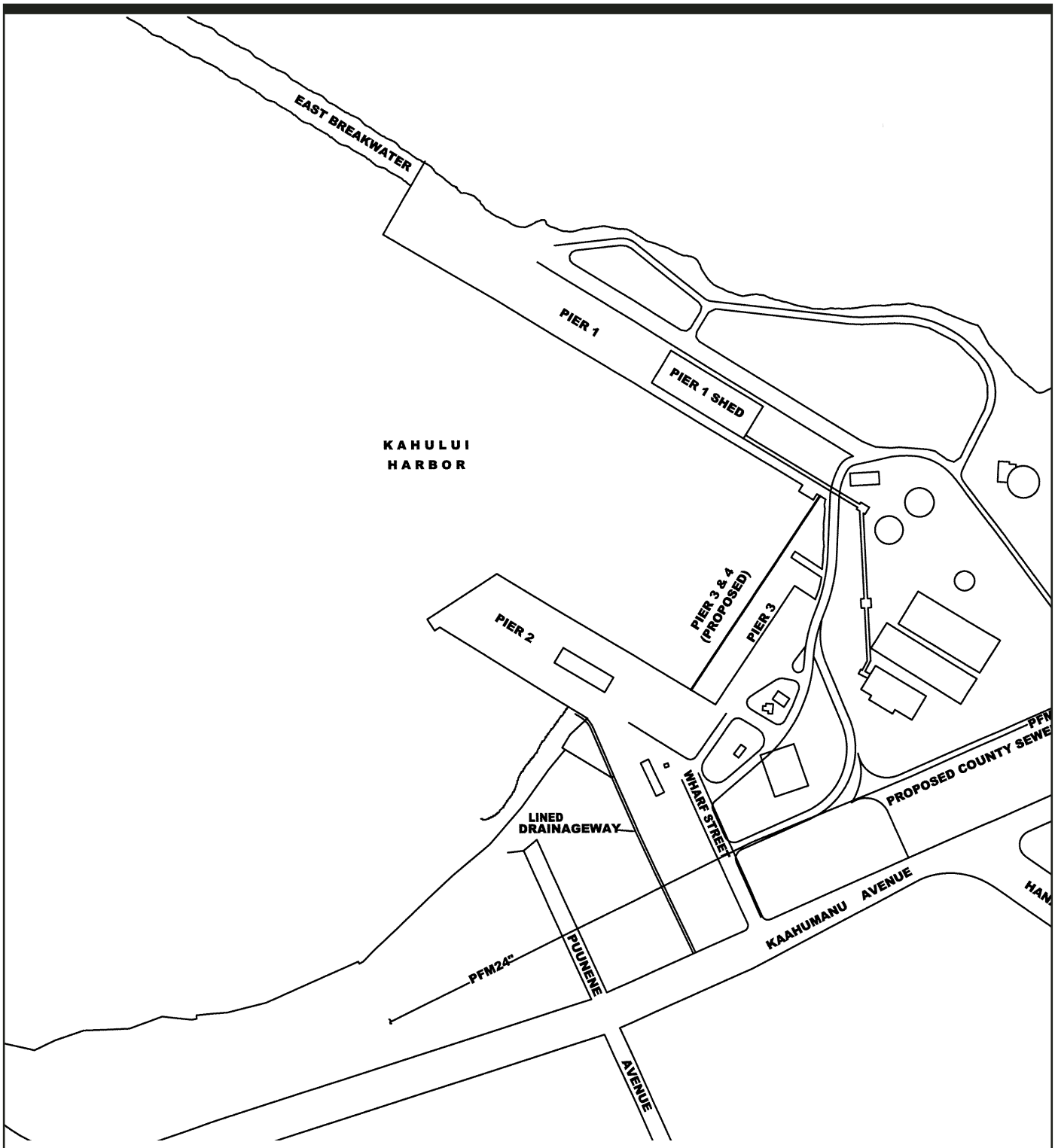

Source: Edward K. Noda and Associates, Inc. January 2005. Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvements, Kahului Commercial Harbor. State of Hawaii, Department of Transportation.

Figure 2
PIERS 3 AND 4, LINEAR—OTHER ACTION ALTERNATIVE

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2.3 No-Action Alternative

Under the no-action alternative, the proposed improvements described above would not be constructed within the short term. However, shipping traffic, cargo tonnage, and passenger volumes would still increase. With no new piers or infrastructure, forecast vessel traffic would be accommodated with existing facilities, causing substantial overflow of these facilities and producing delays in the loading and unloading of cargo and passengers. Ships awaiting berthing would have to either moor offshore or wait at other ports until space becomes available. Container storage space would be inadequate. These inefficiencies would add to the cost of goods transported into and out of Maui.

2.4 Project Funding

Commercial harbor improvements are typically financed solely with State of Hawaii funds, either through the Harbors Special Fund or the General Fund. DOT Harbors Division usually funds its operating and capital improvement expenses through the Harbors Special Fund, derived from fees collected from commercial harbor users. The estimated construction costs of the projects described in this chapter are as follows:

TABLE 2
ESTIMATED COST OF PROPOSED SHORT-TERM IMPROVEMENTS

Projects	Estimated Cost
Pier 1D	$1,000,000
Pier 1 waterline	$1,000,000
New Pier 4, angled (preferred alternative)	$26,000,000
Piers 3 and 4, linear (other alternative)	$39,000,000
Puʻunēnē storage yard improvements	$3,464,775

2.5 Required Permits and Approvals

The following government consultations and permits will be required to develop components of the subject projects that involve in-water work:

- Clean Water Act Section 404 permit: U.S. Army Corps of Engineers, State of Hawaii Department of Health (DOH)
- Clean Water Act Section 401 water quality certification: State of Hawaii DOH, U.S. Environmental Protection Agency (EPA)
- Rivers and Harbors Act, Section 10 permit: U.S. Army Corps of Engineers

In addition, the projects will require a National Pollutant Discharge Elimination System (NPDES) permit for construction activities from State DOH.

Most of Kahului Commercial Harbor land is within the State Urban District and zoned Industrial by Maui County. The harbor is located within the Special Management Area (SMA) and the County's Wailuku-Kahului Community Plan area. Development in the SMA is regulated through the County's SMA permit system. DOT Harbors Division is exempt from county permitting requirements, including the SMA permit and county zoning approval, pursuant to Hawaii Revised Statutes (HRS) Chapter 266-2(b).[2]

[2] HRS Chapter 266-2(b) states "Notwithstanding any law or provision to the contrary, the department of transportation is authorized to plan, construct, operate, and maintain any harbor facility in the State, including, but not limited to, the acquisition and use of lands necessary to stockpile dredged spoils, without the approval of county agencies."

Chapter 3
Affected Environment, Environmental Consequences, and Proposed Mitigation

3.1 Introduction

As explained in Chapter 1, the analysis in this document is limited to traffic impacts associated with the short-term improvements proposed in the *Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvement, Kahului Commercial Harbor* (2025 EA) (November 2005). This chapter begins with an overview description of the environmental setting, including harbor facilities, major streets in the area, and points of interest in the harbor vicinity. The traffic analysis follows.

3.2 Overview – The Environmental Setting

Kahului Commercial Harbor is the busiest neighbor island deep-draft harbor and ranks as the third busiest in the state. It is the only commercial harbor on the Island of Maui. The bulk of goods used by Maui's residents and visitors are imported via the commercial harbor. Commercial operations are currently limited to approximately 50 acres on the east side of the harbor, including three major berthing facilities (Piers 1, 2, and 3) with storage areas, warehouses, harbor offices, and tenant buildings. See Figure 3.

The subject property consists of Tax Map Keys (TMKs) 3-7-01: 21 & 22; 3-7-10: 2, 3, 6, 13, 15, 21, 22, 24, 26, 27, 28, 30, 32 & 34; and 3-7-08: 2, 3, 4 & 6. It is located in Kahului in the district of Wailuku, on the north side of the island of Maui. The project area for the 2025 Master Plan short-term improvements is comprised of the East Breakwater; the three piers; and land bounded by Kaʻahumanu Avenue and the shoreline between Puʻunēnē Avenue and Hobron Avenue.

Pier 1 provides 1,658 feet of berthing space and has approximately 17.6 acres of paved areas for cargo operations, circulation, and parking. Nominal water depth is 35 feet. A shed behind the pier is used as a passenger terminal and for equipment storage. Other facilities on Pier 1 include transmission pipelines for gasoline, kerosene, diesel, fuel oil, and molasses and a conveyor for sugar, as well as a mobile crane.

Pier 2 has a total available berthing space of 1,184 feet, and a portion of the pier has been strengthened to support heavy-lift cargo operations. The nominal water depth along the pier varies between 27 and 32 feet. Combined backlands for Piers 2 and 3 total about 20.9 acres of paved surface for cargo operations, ferry operations, circulation, and cement storage. Transmission pipelines for cement and propane

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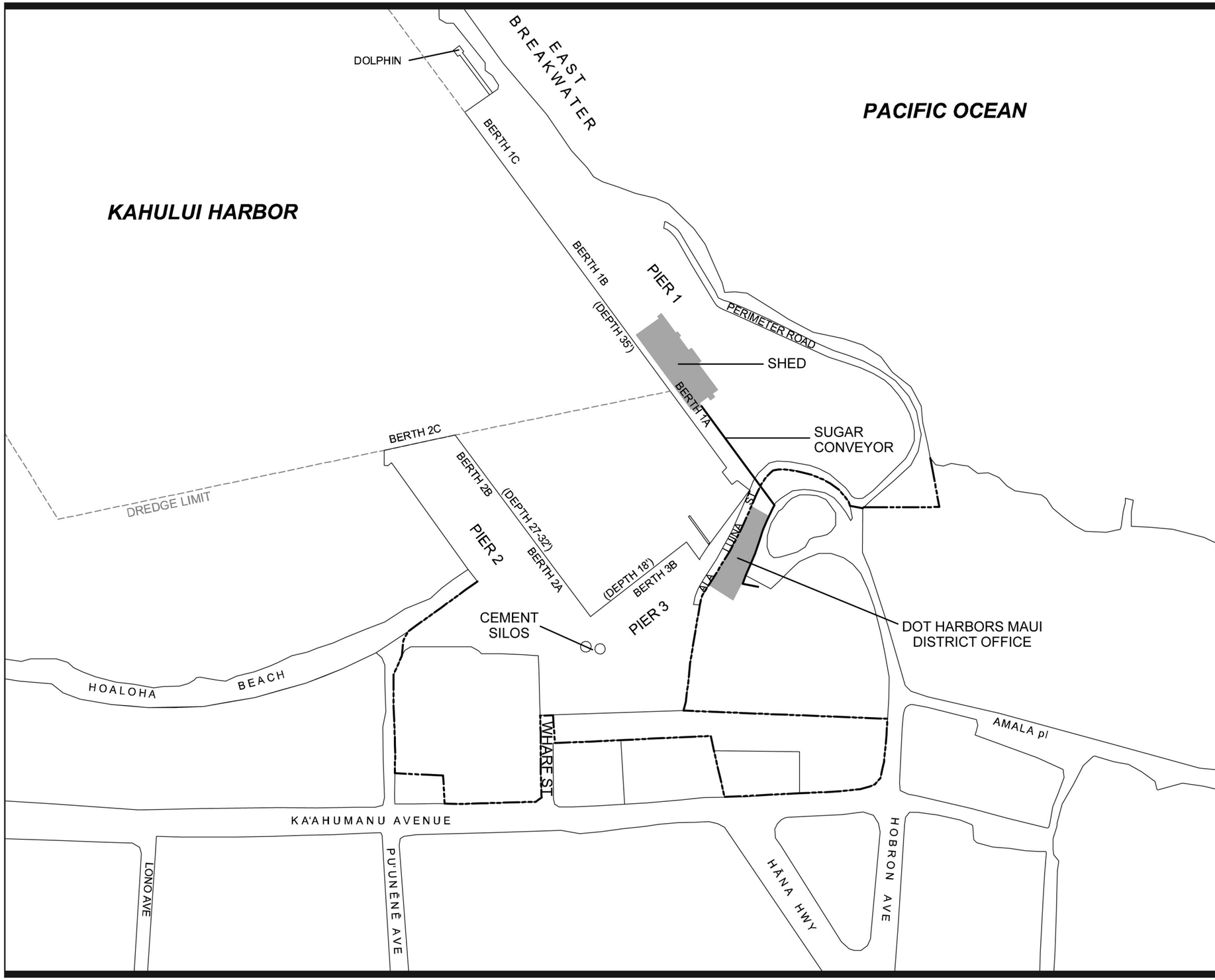

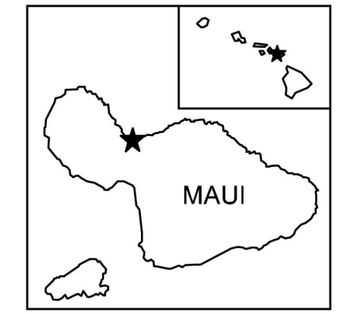

CHANNEL & TURNING BASIN

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Figure 3
CURRENT FACILITIES AT KAHULUI COMMERCIAL HARBOR

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serve Pier 2. Cement is stored in silos located landside near the corner of Piers 2 and 3.

Pier 3 is situated between and perpendicular to Piers 1 and 2. The pier is 500 feet long, with a nominal water depth of only 18 feet, which limits its ability to berth larger or fully-loaded vessels. Additional facilities include transmission pipelines for gasoline, jet fuel, fuel oil, and ethanol.

Streets in the harbor vicinity are Kaʻahumanu Avenue, Puʻunēnē Avenue, Hobron Avenue, Hana Highway, Wharf Street, and Ala Luina Street.[3] Hana Highway and Kaʻahumanu Avenue function as major roadways in the area, serving both regional and local vehicular traffic. See Figure 4, Vicinity Map.

Kahului serves as Maui's transportation hub and retail/industrial center. Kahului Airport is the major airport in the county. As shown in Figure 4, neighborhood and other points of interest near the harbor include low-rise commercial and residential areas, the Harbor Lights condominium complex, recreation fields, the Maui Arts and Culture Center, Maui Community College, two low-rise hotels along the waterfront, Hoaloha Park with facilities for the canoe clubs that practice in the harbor, three shopping centers inland of Kaʻahumanu Avenue, a bank, automobile dealer's lot, and buildings leased to multiple tenants on the seaward side of Kaʻahumanu Avenue, and an industrial area with harbor-related operations and warehouses adjacent to the harbor.

3.3 Traffic

Fehr & Peers/Kaku Associates performed a traffic analysis for this Supplemental EA (see Appendix A). The findings are presented below.

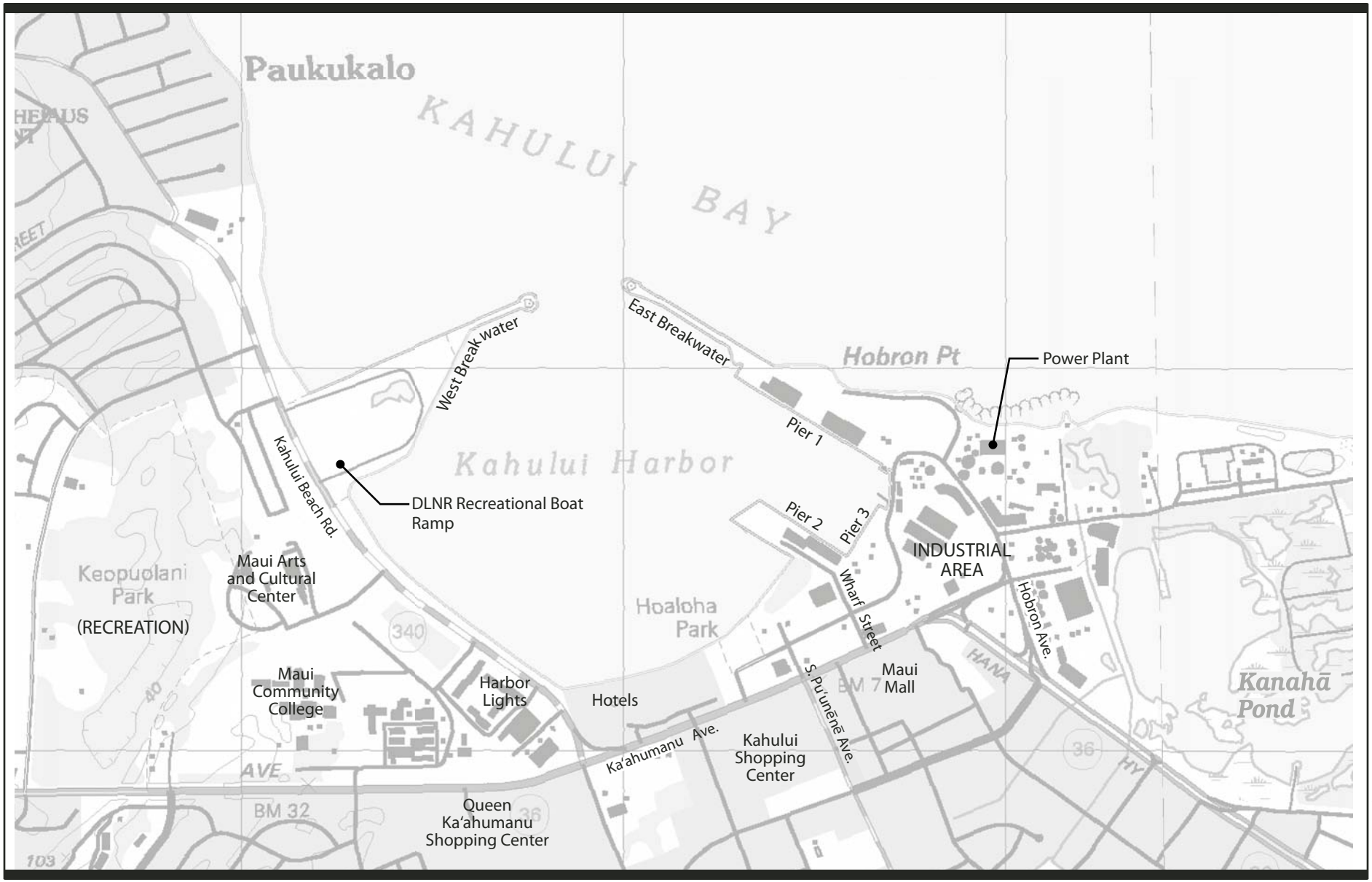
3.3.1 Existing Conditions

Study Intersections and Counts of Existing Traffic

Access to Kahului Harbor is provided at three locations along Kaʻahumanu Avenue: Puʻunēnē Avenue, Wharf Street, and Hobron Avenue (see Figure 4). The signalized intersections at Puʻunēnē Avenue and Wharf Street offer access to Piers 2 and 3. The Hobron Avenue intersection, controlled by a stop sign, provides access to Pier 1.

Traffic counts were conducted in April 2007 at the three intersections during the following time periods: morning (7:00-9:00 AM), mid-morning (9:00-11:00 AM), and afternoon (3:30-5:30 PM). These counts were performed as part of a traffic study carried out by Fehr & Peers/Kaku Associates for the State DOT's proposed Kahului Commercial Harbor 2030 Master Plan. The traffic study, dated

[3] Ala Luina Street is a limited-access roadway within the harbor. It has been closed to general traffic since February 2007.



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Source: U.S. Geological Survey. October 2004. Digital Raster Graphic. Project area boundary determined from Tax Map Key (First American Real Estate Solutions. 2006. Realty Atlas, Hawaii. Counties of Maui and Kalawao. Zones 3 thru 6.)

Figure 4
VICINITY MAP

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November 2007, is presented in Appendix B. Additional counts were conducted at the Pu‘unene Avenue and Wharf Street intersections in January 2008 during the late afternoon time period (5:00-8:00 PM).

To reflect 2008 conditions, the 2007 traffic counts were adjusted with ambient annual growth factors. These growth factors were developed from the Maui islandwide transportation demand forecasting model developed for the County of Maui as part of a long-range transportation planning effort.[4]

Traffic demand forecasts on the arterial streets (Ka‘ahumanu and Pu‘unēnē Avenues) were assessed using data from the model, which provided average yearly growth factors for each major highway in the area. These factors, summarized in Table 3 below, indicate annual growth rates for Ka‘ahumanu Avenue of less than one percent per year for both the morning and afternoon peak hours. For Pu‘unēnē Avenue, the rates are almost three percent per year for the morning peak hour and almost two percent per year for the evening peak hour.

TABLE 3
PEAK HOUR GROWTH FACTORS

Location	A.M. Peak Hour	P.M. Peak Hour
	Annual Growth Rate	Annual Growth Rate
Ka'ahumanu Avenue	0.7%	0.4%
Pu'unene Avenue	2.7%	1.6%
Minor Streets	0.4%	0.4%

Note: Mid-morning peak hour assumes the same growth as a.m. peak hour.

The growth rates were applied to major movements from the identified arterial (through movements on Ka‘ahumanu Avenue and turns onto/from Pu‘unēnē Avenue). All other minor movements were assumed to grow by 0.4 percent. For purposes of this analysis, growth rates applied to the mid-morning period were assumed to be the same as the morning peak hour.

Adjustments to Account for Hawaii Superferry Operations

When the traffic counts were collected in 2007 and 2008, the Hawaii Superferry (HSF) was not operational. Based on scheduled sailings at Kahului Harbor, the mid-morning and potentially the late afternoon time periods require adjustments to account for HSF operations. Based on HSF information, the average daily demand is estimated at 110 vehicles per sailing, and the peak day demand is estimated at 153 vehicles per sailing. These estimates were converted into peak hour vehicle trips using the following assumptions:

[4] Development of the model is fully documented in *Maui Island Traffic Impact Fee Report and Comprehensive Roadway Master Plan* (Kaku Associates, Inc., November 2006).

1. Other than the exception noted in item 5 below, all traffic generated by loading and unloading of vehicles and passengers would occur in one hour.

2. Passengers with vehicles boarding the ferry would generate one vehicle trip per passenger in the inbound (toward the harbor) direction.

3. Passengers with vehicles disembarking from the ferry would generate one vehicle trip per passenger in the outboard direction.

4. Loading and unloading passengers without vehicles would generate two vehicle trips per passenger—one trip inbound and one outbound.

5. Only 90 percent of the passengers loading onto the ferry (both with and without vehicles) would arrive at the harbor during the peak hour.

These assumptions were used to develop the HSF traffic generation estimates shown in Table 4. Weekday average demand is projected at 267 total vehicles per hour. Peak daily demand is projected at 371 total vehicles per hour. To maintain a conservative analysis, trip generation for the peak day demand was applied to the study intersections. This HSF traffic demand scenario was applied to account for the HSF sailings during the mid-morning and (potentially) the late afternoon periods.

TABLE 4
HSF TRIP GENERATION FORECASTS

HSF Demand Scenario	Trip Generation (Vehicles)		
	Inbound	Outbound	Total
Projected Average Daily	128	139	267
Projected Peak Day	178	193	371

In a separate study, reported in a memorandum dated January 30, 2008 (Appendix C), Fehr & Peers/Kaku Associates observed actual traffic conditions in the vicinity of Kahului Harbor to assess traffic impacts of HSF on the local street system. These field observations, conducted between January 20 and 23, 2008, occurred at the two intersections that provide access to HSF's terminal on Pier 2—Kaʻahumanu Avenue/Puʻunēnē Avenue and Kaʻahumanu Avenue/Wharf Street. The observations were not incorporated into the Level of Service (LOS) analysis described below, but the findings offer some context regarding HSF's relative contribution to traffic in the harbor vicinity.

This effort focused on potential traffic issues caused by the loading and unloading of passenger vehicles. At the time of the observations, two sailings were scheduled each day at Kahului Harbor: the 10:15 AM arrival from Honolulu and the 11:15 AM departure to Honolulu. HSF's published information indicates that gates are opened approximately two hours prior to departure and closed approximately 30 minutes prior to departure. Field observations were performed over the entire period around the overlapping arrival and departure times.

HSF provided actual passenger load numbers on the four days of field observations. The largest loads observed was on Monday, January 21—the Martin Luther King, Jr. holiday—with 135 vehicles, of which 41 were returning to Kahului and 94 were departing from Kahului. Based on conversations with HSF staff, this was the largest loads since HSF services restarted in November 2007. The remainder of the observations showed total vehicular loads ranging from 59 to 80 vehicles, with an average split of 40 percent returning to Kahului and 60 percent departing from Kahului.

Both intersections operated freely without congestion on all four days during the ferry loading and unloading of vehicles, with little or no queuing of vehicles on any approach to the intersections and without any delays associated with ferry operations. Traffic control officers directed traffic at Kaʻahumanu Avenue and Puʻunēnē Avenue. Disembarking vehicles departing the harbor were controlled. Officers ensured that these vehicles did not block vehicles attempting to access the bank parking lot, accessing other areas in the harbor, or arriving to board the ferry. They also ensured that vehicles were not allowed to leave the harbor area if no queuing space was available on the southbound leg of Puʻunēnē Avenue.

On Monday, January 21, the intersections were congested between approximately 11:00 AM and 12:00 noon. Primarily caused by the higher than normal traffic volumes on Kaʻahumanu Avenue, this congestion occurred after all vehicles disembarking the ferry had departed the area and after all vehicles embarking the ferry had arrived and were either on the ferry or within the harbor gates. According to the traffic control officers and harbor staff, the high traffic volumes and subsequent congestion was generated by holiday activities at the adjacent shopping centers.

Existing Level of Service (LOS)

Level of Service (LOS) is a qualitative measure used to describe the condition of traffic flow, ranging from excellent (LOS A) to overloaded (LOS F). The LOS definitions for signalized and unsignalized intersections are given in Tables 5 and 6 below. LOS D is typically considered the minimum acceptable LOS in urban areas.

TABLE 5
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

Level of Service	Volume/Capacity	Average Stopped Delay per Vehicle (seconds)
A	0.000 – 0.600	≤10
B	>0.600 – 0.700	>10 and ≤20
C	>0.700 - 0.800	>20 and ≤35
D	>0.800 - 0.900	>35 and ≤55
E	>0.900 - 1.000	>55 and ≤80
F	> 1.000	>80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

TABLE 6
LEVEL OF SERVICE DEFINITIONS FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Average Total Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, *2000*

LOS analyses were conducted at the study intersections to determine existing operating conditions both with and without HSF, using the operations methodology for signalized and unsignalized intersections from the *2000 Highway Capacity Manual* (Transportation Research Board, 2000).

As shown in Table 7, the three intersections operate at LOS C or better during each peak hour. The intersection delay at Kaʻahumanu Avenue and Puʻunēnē Avenue ranges between 19 and 30 seconds. At the Kaʻahumanu Avenue/Wharf Street intersection, the delay ranges between seven and 12 seconds. Intersection delay at Kaʻahumanu Avenue and Hobron Avenue ranges between 15 and 21 seconds.

TABLE 7
EXISTING INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	Existing (2008) Del/Veh[1]	Existing (2008) LOS	Existing + HSF Del/Veh[1]	Existing + HSF LOS	Change in Delay
1. Ka'ahumanu Av & Pu'unene Av	A.M.	18.3	B	18.3	B	0.0
	Mid-A.M.	22.2	C	28.4	C	6.2
	P.M.	27.2	C	27.2	C	0.0
	Late-P.M.	21.5	C	28.6	C	7.1
2. Ka'ahumanu Av & Wharf St	A.M.	6.7	A	6.7	A	0.0
	Mid-A.M.	9.2	A	9.4	A	0.2
	P.M.	11.5	B	11.5	B	0.0
	Late-P.M.	11.8	B	12.1	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	15.4	C	15.4	C	0.0
	Mid-A.M.	17.6	C	17.6	C	0.0
	P.M.	20.9	C	20.9	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

With the addition of HSF-generated traffic, the Ka‘ahumanu Avenue/Pu‘unēnē Avenue intersection experiences an additional five seconds of delay during the mid-morning period and an additional seven seconds of delay during the late afternoon period. Although the intersection delay increases, the intersection continues to operate at LOS C with HSF traffic.

At the Ka‘ahumanu Avenue/Wharf Street intersection, the addition of HSF traffic results in an increase in delay of approximately two seconds during the mid-morning period and a negligible increase during the late afternoon period. The condition at this intersection increases to LOS B during the mid-morning period and remains at LOS A during the late afternoon period with HSF traffic. Adding HSF

traffic at Ka‘ahumanu Avenue and Hobron Avenue does not result in an increase of intersection delay.

Each intersection continues to operate at an acceptable LOS during each period with the addition of HSF traffic.

3.3.2 Potential Impacts and Proposed Mitigation

Proposed Action (Preferred Alternative)

The year 2015 conditions were analyzed for effects of the proposed action on traffic operations. This is when the short-term harbor improvements described in the 2025 EA as the preferred alternative are proposed for completion. Assumptions used to develop the 2015 conditions include ambient background traffic growth, short-term harbor improvement projects, and HSF traffic. Ambient growth rates are described above. The growth rates were applied in an identical manner over a seven year period to estimate the background traffic growth in 2015. The afternoon growth rate was applied to the late afternoon period. Traffic related to the proposed action—the short-term harbor improvements—was assigned to the study intersections to account for the addition of port-related traffic. Traffic related to the HSF was also assigned to the intersections in a manner identical to that described above

Table 8 presents the projected 2015 LOS for the study intersections during each analyzed peak period. The intersections are projected to operate at LOS C or better during each time period without HSF traffic.

TABLE 8
FUTURE WITH PROJECT CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	With Project (2015) Del/Veh[1]	LOS	With Project + HSF Del/Veh[1]	LOS	Change in Delay
1. Ka'ahumanu Av & Pu'unene Av	A.M.	19.4	B	19.4	B	0.0
	Mid-A.M.	23.0	C	32.7	C	9.7
	P.M.	29.4	C	29.4	C	0.0
	Late-P.M.	23.2	C	31.1	C	7.9
2. Ka'ahumanu Av & Wharf St	A.M.	7.9	A	7.9	A	0.0
	Mid-A.M.	9.5	A	9.6	A	0.1
	P.M.	12.3	B	12.3	B	0.0
	Late-P.M.	12.3	B	12.6	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	16.0	C	16.0	C	0.0
	Mid-A.M.	18.5	C	18.5	C	0.0
	P.M.	22.2	C	22.2	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

With HSF traffic, the Kaʻahumanu Avenue/Puʻunēnē Avenue intersection is projected to experience an additional 10 seconds of delay during the mid-morning and eight seconds of delay during the late afternoon period. This intersection is projected to continue operating at LOS C.

Adding HSF traffic to Kaʻahumanu Avenue and Wharf Street results in a negligible increase during the mid-morning and late afternoon periods, with the intersection continuing to operate at LOS C.

The Kaʻahumanu Avenue/Hobron Avenue intersection does not experience an increase in intersection delay due to the addition of HSF traffic and is projected to continue operating at LOS C.

Like the existing conditions, each study intersection continues to operate at an acceptable LOS during each period with the addition of HSF traffic.

The three study intersections currently operate at LOS C or better during all peak periods, both with and without the addition of HSF-related traffic. Projecting the operating conditions at 2015, when the short-term harbor improvements (proposed action/preferred alternative) are expected to be completed, the intersections are expected to continue operating at an acceptable level of service (LOS C or better). Therefore, no mitigation is required.

Other Action Alternative (Piers 3 and 4, Linear)

Traffic impacts associated with the Other Action Alternative, characterized by a linear alignment of Piers 3 and 4, would be the same or similar to those described above for the Proposed Action (Preferred Alternative). Construction of the short-term improvements under this alternative is expected to be completed within the same timeframe—the year 2015. The same assumptions regarding growth rates and port-related traffic apply. The three study intersections are expected to continue operating at LOS C or better. Therefore, no mitigation is required.

No-Action Alternative

Projected operating conditions of the No-Action Alternative are summarized in Table 9. Each intersection is projected to operate at LOS C or better during each peak period with and without the addition of HSF traffic. Adding HSF traffic results in an increase in delay of eight to nine seconds at Kaʻahumanu Avenue and Puʻunēnē Avenue, a negligible increase in delay at Kaʻahumanu Avenue and Wharf Street, and no additional delay at Kaʻahumanu Avenue and Hobron Avenue. The intersections are projected to continue operating at an acceptable LOS.

TABLE 9
FUTURE NO BUILD CONDITION INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	No Build (2015) Del/Veh[1]	No Build (2015) LOS	No Build + HSF Del/Veh[1]	No Build + HSF LOS	Change in Delay
1. Ka'ahumanu Av & Pu'unene Av	A.M.	19.0	B	19.0	B	0.0
	Mid-A.M.	22.9	C	32.3	C	9.4
	P.M.	28.6	C	28.6	C	0.0
	Late-P.M.	22.7	C	30.2	C	7.5
2. Ka'ahumanu Av & Wharf St	A.M.	7.7	A	7.7	A	0.0
	Mid-A.M.	9.3	A	9.6	A	0.3
	P.M.	12.1	B	12.1	B	0.0
	Late-P.M.	12.1	B	12.4	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	15.8	C	15.8	C	0.0
	Mid-A.M.	18.3	C	18.3	C	0.0
	P.M.	21.9	C	21.9	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

Construction-related Impacts

Management measures would be implemented as part of the proposed action and other action alternative to avoid or minimize potential traffic impacts during construction of the short-term improvements. Construction-related traffic impacts are not considered significant since they are temporary and controlled by having the contractor follow best practices. In the case of traffic, these may include following a traffic management plan that limits certain activities to non-peak hours and providing traffic control measures when needed to assure safety and minimize congestion. Since the proposed improvements are all located within the harbor complex, impacts on public roads are further minimized.

3.4 Secondary and Cumulative Impacts

Secondary impacts are those impacts caused by the action that are later in time or further removed in distance but still reasonably foreseeable (HAR 11-20-2). No secondary impacts are expected relative to traffic. No traffic mitigation is required that would involve future construction or effects on public facilities.

Cumulative impacts are environmental impacts resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (HAR 11-200-2). Traffic analyses are conducted to determine cumulative impacts. The findings of the traffic study conducted for this Supplemental EA considered ambient conditions and growth factors, including population, economic, and development projections.

Chapter 4
Determination and Findings

Based on the analysis documented herein, the expected determination is a Finding of No Significant Impact (FONSI). This determination has taken into consideration primary and secondary traffic consequences of the proposed action and alternatives, which are considered cumulative impacts, including short-term and long-term effects. In summary, the project would have no significant traffic impacts and can be accommodated by existing and planned infrastructure.

Following is a discussion of the FONSI determination, using the applicable significance criteria established in HAR Section 11-200-12 to evaluate project impacts that are relevant to the scope of this document, i.e., the subject matter of traffic impacts only. Pursuant to subparagraph 12, *….an action shall be determined to have a significant effect on the environment if it:*

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.

Projected traffic conditions associated with the proposed action and alternatives have no impact on natural and cultural resources.

(2) Curtails the range of beneficial uses of the environment.

Projected traffic conditions associated with the proposed action and alternatives do not curtail the range of beneficial uses of the environment.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revision thereof and amendments thereto, court decisions, or executive orders.

The proposed action is being carried out in compliance and in concert with the applicable environmental policies, goals, and guidelines

(4) Substantially affects the economic and social welfare of the community or state.

No economic or social welfare issues are associated with traffic impacts.

(5) Substantially affects public health.

No public health issues are associated with the proposed action and its traffic impacts.

(6) Involves substantial secondary impacts such as population changes or effects on public facilities.

No population changes or substantial effects on public facilities are associated with the proposed action or alternatives. No improvements to public roadways are required.

(7) Involves a substantial degradation of environmental quality.

No degradation of environmental quality is associated with the proposed action and alternatives. Traffic conditions are projected to remain at acceptable levels.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

Cumulative impacts disclosed in this EA, specifically traffic, would not have considerable effects upon the environment or involve a commitment for larger actions. No mitigation is required.

(9) Substantially affects a rare, threatened, or endangered species, or its habitat.

No rare, threatened, or endangered species, or their habitat, occur in the project area (not applicable to traffic impacts).

(10) Detrimentally affects air or water quality or ambient noise levels.

With traffic conditions projected to remain at acceptable levels, no detrimental impacts on local air quality are expected due to emissions from idling vehicles.

Water quality and ambient noise levels: not applicable to traffic.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.

Not applicable to traffic.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies.

Not applicable to traffic.

(13) Requires substantial energy consumption.

The proposed action and its associated traffic do not require substantial energy consumption.

Chapter 5
Consulted Parties

5.1 Pre-Assessment Consultation

Fehr & Peers/Kaku Associates consulted with planning staff in the State Department of Transportation Highways Division.

DOT Harbors consulted with the Office of Environmental Quality Control regarding the appropriate accepting authority/determination agency for this document.

5.2 Draft EA Distribution List

The distribution list for this document in presented in Appendix D.

Chapter 6
References

Belt Collins Hawaii Ltd. (December 2007) *Kahului Commercial Harbor 2030 Master Plan Draft Environmental Impact Statement*

Edward K. Noda and Associates, Inc. (November 2005) *Final Environmental Assessment and Finding of No Significant Impact, 2025 Master Plan Improvements, Kahului Commercial Harbor*

Fehr & Peers/Kaku Associates (February 7, 2008) "Memorandum to Belt Collins Hawaii – Kahului Harbor Supplemental EA for 2015"

Fehr & Peers/Kaku Associates (January 30, 2008) "Memorandum to Belt Collins Hawaii – Kahului Harbor Supplemental EA for 2015"

Fehr & Peers/Kaku Associates (November 2007) *Kahului Harbor Master Plan Traffic Study,* prepared for State of Hawaii Department of Transportation.

Kaku Associates, Inc. (November 2006) *Maui Island Traffic Impact Fee Report and Comprehensive Roadway Master Plan*

APPENDIX A

Memo from Fehr & Peers / Kaku Associates
February 7, 2008

FEHR & PEERS
KAKU ASSOCIATES

MEMORANDUM

TO: Sue Sakai, Belt Collins Hawaii

FROM: Dick Kaku, Eugene Tang and Michael Kennedy

DATE: February 7, 2008

SUBJECT: Kahului Harbor Supplemental EA for 2015 **Ref:** LA07-2191

Fehr & Peers/Kaku Associates performed an analysis of traffic conditions at the Kahului Harbor on the island of Maui and the effect of the Hawaii Super Ferry (HSF) on traffic operations. The analyses examine existing year conditions and 2015 conditions at the harbor.

STUDY INTERSECTIONS AND EXISTING TRAFFIC COUNTS

Access into Kahului Harbor is provided at three locations along Ka'ahumanu Avenue: Pu'unene Avenue, Wharf Street, and Hobron Avenue. The intersections at Pu'unene Avenue and Wharf Street provide access onto Piers 2 & 3 and are signalized. The Hobron Avenue intersection provides access onto Pier 1 and is controlled by a stop sign.

Traffic counts were conducted in April 2007 at the three study intersections during the following time periods:

- Morning (7:00 - 9:00 AM)
- Mid-morning (9:00 -11:00 AM)
- Afternoon (3:30 - 5:30 PM)

An additional series of traffic counts were collected at the Pu'unene Avenue and Wharf Street intersections in January 2008 for the following time period:

- Late afternoon (5:00 - 8:00 PM)

In order to reflect 2008 conditions, the year 2007 traffic counts were adjusted with ambient annual growth factors. The growth factors were developed from the Maui islandwide transportation demand forecasting model developed for the County as part of a long-range transportation planning effort. The development of the model is fully documented in *Maui Island Traffic Impact Fee Report and Comprehensive Roadway Master Plan* (Kaku Associates, Inc., November 2006).

201 Santa Monica Blvd, Ste 500
Santa Monica, CA 90401
T: (310) 458-9916
F: (310) 394-7663
fehrandpeers.com

Traffic demand forecasts on the arterial streets (Ka'ahumanu Avenue and Pu'unene Avenue) in the study area were assessed using data from the model. The County of Maui transportation travel demand model provided average yearly growth factors for each of the major highways in the area. These factors, summarized in Table 1, indicate that the annual growth rates for Ka'ahumanu Avenue are projected to be less than 1% per year for both the morning and afternoon peak hours. The rates for Pu'unene Avenue are almost 3% per year for the morning peak hour and almost 2% per year for the evening peak hour. The growth rates were applied to the major movements from the identified arterial (i.e., through movements on Ka'ahumanu Avenue and turns onto/from Pu'unene Avenue). All other minor movements were grown by 0.4%. For the purposes of this analysis, the growth rates applied to the mid-morning period were assumed to be the same as the morning peak hour.

When the traffic counts were collected in 2007 and 2008, the HSF was not yet operational in the time periods counted. Based on the scheduled sailings from Kahului Harbor, the mid-morning and late-afternoon time periods would require adjustments to account for the HSF sailings. The HSF does not sail from Kahului Harbor during the AM and PM peak hours. Traffic volume estimates for the HSF were added to both analyzed intersections during the affected peak hours; the HSF trip generation is detailed below.

HSF TRIP GENERATION

Daily trip generation estimates were developed based on information provided by HSF; vehicle demand for the HSF is projected on a weekly basis varying by day of week. Based on the HSF information, the average daily demand is estimated at 110 vehicles and the peak day demand is estimated at 153 vehicles per sailing. These estimates were converted into peak hour vehicle trips using the following assumptions:

1. Other than the exception noted in Item 5 below, all traffic generated by loading and unloading of vehicles and passengers would occur in one hour.

2. Passengers with vehicles boarding the ferry would generate one vehicle trip per passenger in the inbound (toward the harbor) direction.

3. Passengers with vehicles disembarking from the ferry would generate one vehicle trip per passenger in the outbound direction.

4. Loading and unloading passengers without vehicles would generate two vehicle trips per passenger, one trip inbound and one outbound.

5. Only 90% of the passengers loading onto the ferry (both with and without vehicles) would arrive at the harbor during the peak hour.

These assumptions were used to develop the HSF traffic generation estimates. As shown in Table 2, the weekday average demand is projected at 267 total vehicles per hour and the peak

daily demand is projected at 371 total vehicles per hour. In order to maintain a conservative analysis, trip generation for the peak day demand was applied to the study intersections. This HSF demand scenario was applied to account for the HSF sailings during the mid-morning and late-afternoon periods.

EXISTING CONDITIONS LEVEL OF SERVICE

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow ranging from excellent conditions (LOS A) to overloaded conditions (LOS F). The LOS definitions for signalized and unsignalized intersections are provided in Table 3 and 4, respectively. LOS D is typically considered the minimum acceptable LOS in urban areas.

LOS analyses were conducted at the study intersections to determine existing operating conditions both with and without the HSF using the operations methodology for signalized and unsignalized intersections from *2000 Highway Capacity Manual* (2000 HCM) (Transportation Research Board, 2000).

As shown in Table 5, the existing LOS for the study intersections during the analyzed time periods indicates that each intersection operates at LOS C or better during each peak hour. The intersection delay at Ka'ahumanu Avenue & Pu'unene Avenue ranges between 19 and 30 seconds. The delay at the intersection of Ka'ahumanu Avenue & Wharf Street ranges between seven and 12 seconds. Intersection delay at Ka'ahumanu Avenue & Hobron Avenue ranges between 15 and 21 seconds.

With the addition of HSF-generated traffic, Ka'ahumanu Avenue & Pu'unene Avenue experiences an additional five seconds of delay during the mid-morning and an additional seven seconds of delay during the late-afternoon period. Although the intersection delay increases, the intersection continues to operate at LOS C with HSF traffic. At the intersection of Ka'ahumanu Avenue & Wharf Street, the addition of HSF traffic results in an increase in delay of approximately two seconds during the mid-morning and a negligible increase during the late-afternoon period. The intersection LOS increases to LOS B during the mid-morning and remains at LOS A during the late-afternoon period with HSF traffic. The addition of HSF traffic at Ka'ahumanu Avenue & Hobron Avenue does not result in an increase of intersection delay.

Each intersection continues to operate at an acceptable LOS during each period with the addition of HSF traffic.

FUTURE CONDITIONS LEVEL OF SERVICE

The assumptions used to develop the 2015 conditions include ambient background traffic growth, short-term (relative to the 2025 analysis) port improvement projects, and HSF traffic. Two Kahului Harbor alternatives were analyzed: No Build and Project. The No Build alternative assumes that short-term port improvement projects will not occur. The Project scenario

assumes that the short-term port improvement projects will occur. These year 2015 conditions were also analyzed for effects of the HSF on traffic operations.

The ambient growth rate was described above. The growth rates were applied in an identical manner over a seven-year period to estimate the background traffic growth in 2015; the afternoon growth rate was applied to the late-afternoon period. The short-term port improvement projects include facility upgrades and the expansion of select piers. The traffic related to these port improvements was assigned to the analyzed intersections to account for the addition of port-related traffic. Traffic related to the HSF was also assigned to the intersections in a manner identical to that previously described.

The projected operating conditions of the No Build alternative are summarized in Table 6. As shown, each intersection is projected to operate at LOS C or better during each peak period with and without the addition of HSF traffic. The addition of HSF traffic results in an increase in delay of eight to nine seconds at Ka'ahumanu Avenue & Pu'unene Avenue, a negligible increase in delay at Ka'ahumanu Avenue & Wharf Street, and no additional delay at Ka'ahumanu Avenue & Hobron Avenue. The intersections are projected to continue operating at an acceptable LOS.

Table 7 presents the projected 2015 LOS for the study intersections during each analyzed peak period. As shown, the intersections are projected to operate at LOS C or better during each time period without HSF traffic.

The intersection of Ka'ahumanu Avenue & Pu'unene Avenue is projected to experience an additional 10 seconds of delay during the mid-morning and eight seconds of delay during the late-afternoon period; the intersection is projected to continue operating at LOS C. The addition of HSF traffic to Ka'ahumanu Avenue & Wharf Street results in a negligible increase during the mid-morning and late-afternoon periods; the intersection is projected to continue operating at LOS C. Ka'ahumanu Avenue & Hobron Avenue does not experience an increase in intersection delay due to the addition of HSF traffic and is projected to continue operating at LOS C.

Like the existing conditions, the addition of HSF traffic to the Project alternative is projected to increase the delay at both intersections; however, the intersections are projected to continue operating at an acceptable LOS.

CONCLUSION

The intersections of Ka'ahumanu Avenue & Pu'unene Avenue, Ka'ahumanu Avenue & Wharf Street, and Ka'ahumanu Avenue & Hobron Avenue currently operate at LOS C or better during all peak periods, both with and without the addition of HSF-related traffic. Projecting the operating conditions at 2015, the intersections are expected to continue operating at an acceptable level of service (LOS C or better) with the No Build and Project alternatives.

TABLE 1
PEAK HOUR GROWTH FACTORS

Location	A.M. Peak Hour Annual Growth Rate	P.M. Peak Hour Annual Growth Rate
Ka'ahumanu Avenue	0.7%	0.4%
Pu'unene Avenue	2.7%	1.6%
Minor Streets	0.4%	0.4%

Note: Mid-morning peak hour assumes the same growth as a.m. peak hour.

TABLE 2
HSF TRIP GENERATION FORECASTS

HSF Demand Scenario	Trip Generation (Vehicles)		
	Inbound	Outbound	Total
Projected Average Daily	128	139	267
Projected Peak Day	178	193	371

TABLE 3
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

Level of Service	Volume/Capacity	Average Stopped Delay per Vehicle (seconds)
A	0.000 – 0.600	≤10
B	>0.600 – 0.700	>10 and ≤20
C	>0.700 - 0.800	>20 and ≤35
D	>0.800 - 0.900	>35 and ≤55
E	>0.900 - 1.000	>55 and ≤80
F	> 1.000	>80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

TABLE 4
LEVEL OF SERVICE DEFINITIONS FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Average Total Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

TABLE 5
EXISTING INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	Existing (2008)		Existing + HSF		Change in Delay
		Del/Veh[1]	LOS	Del/Veh[1]	LOS	
1. Ka'ahumanu Av & Pu'unene Av	A.M.	18.3	B	18.3	B	0.0
	Mid-A.M.	22.2	C	28.4	C	6.2
	P.M.	27.2	C	27.2	C	0.0
	Late-P.M.	21.5	C	28.6	C	7.1
2. Ka'ahumanu Av & Wharf St	A.M.	6.7	A	6.7	A	0.0
	Mid-A.M.	9.2	A	9.4	A	0.2
	P.M.	11.5	B	11.5	B	0.0
	Late-P.M.	11.8	B	12.1	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	15.4	C	15.4	C	0.0
	Mid-A.M.	17.6	C	17.6	C	0.0
	P.M.	20.9	C	20.9	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

TABLE 6
FUTURE NO BUILD CONDITION INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	No Build (2015)		No Build + HSF		Change in Delay
		Del/Veh[1]	LOS	Del/Veh[1]	LOS	
1. Ka'ahumanu Av & Pu'unene Av	A.M.	19.0	B	19.0	B	0.0
	Mid-A.M.	22.9	C	32.3	C	9.4
	P.M.	28.6	C	28.6	C	0.0
	Late-P.M.	22.7	C	30.2	C	7.5
2. Ka'ahumanu Av & Wharf St	A.M.	7.7	A	7.7	A	0.0
	Mid-A.M.	9.3	A	9.6	A	0.3
	P.M.	12.1	B	12.1	B	0.0
	Late-P.M.	12.1	B	12.4	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	15.8	C	15.8	C	0.0
	Mid-A.M.	18.3	C	18.3	C	0.0
	P.M.	21.9	C	21.9	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

TABLE 7
FUTURE WITH PROJECT CONDITIONS INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	With Project (2015)		With Project + HSF		Change in Delay
		Del/Veh[1]	LOS	Del/Veh[1]	LOS	
1. Ka'ahumanu Av & Pu'unene Av	A.M.	19.4	B	19.4	B	0.0
	Mid-A.M.	23.0	C	32.7	C	9.7
	P.M.	29.4	C	29.4	C	0.0
	Late-P.M.	23.2	C	31.1	C	7.9
2. Ka'ahumanu Av & Wharf St	A.M.	7.9	A	7.9	A	0.0
	Mid-A.M.	9.5	A	9.6	A	0.1
	P.M.	12.3	B	12.3	B	0.0
	Late-P.M.	12.3	B	12.6	B	0.3
3. Ka'ahumanu Av & Hobron Av (stop controlled)	A.M.	16.0	C	16.0	C	0.0
	Mid-A.M.	18.5	C	18.5	C	0.0
	P.M.	22.2	C	22.2	C	0.0
	Late-P.M.	N/A		N/A		

Note:
1 Delay indicates average stopped delay per vehicle in seconds.
For stop-controlled intersection: worst-case approach delay is displayed.

APPENDIX B

Kahului Harbor 2030 Master Plan
Traffic Study
November 2007

KAHULUI HARBOR MASTER PLAN
TRAFFIC STUDY

NOVEMBER 2007

PREPARED FOR

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

PREPARED BY

FEHR & PEERS

KAKU ASSOCIATES

KAHULUI HARBOR MASTER PLAN
TRAFFIC STUDY

November 2007

Prepared for:

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

Prepared by:

FEHR & PEERS/KAKU ASSOCIATES
201 Santa Monica Blvd., Suite 500
Santa Monica, California 90401
(310) 458-9916

Ref: 2055

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I. INTRODUCTION

This report documents the results of a traffic study conducted by Fehr & Peers/Kaku Associates to evaluate the potential traffic impacts associated with the potential implementation of the proposed Kahului Harbor Master Plan on the local street system in the Kahului area on the island of Maui. It includes a description of the assumptions and methods used to conduct the study as well as a discussion of the results.

PROJECT DESCRIPTION

The Master Plan proposes several scenarios aimed at addressing the future requirements of the Kahului Harbor. The first scenario is described as the "No Action" scenario, which describes the harbor as it exists today. As illustrated in Figure 1, the description of the "No Action" scenario includes three piers that provide a total of 3,110 feet of pier space, 39.3 acres of open storage, 2.8 acres of covered storage, 10 acres of auto storage, and 5.3 acres for a ferry terminal.

For the purposes of this analysis, the preferred project for the Kahului Harbor Master Plan is referred to as Alternative A. This alternative includes the development of two new piers, Piers 4 and 5, with the creation of a West Breakwater as part of Pier 5. Pier 5, which will be 1,200 feet long with approximately 22 acres of land serving it, will be used to house interisland ferry and cruise ship operations. The departure of ferry operations from Pier 2 and cruise ships from Pier 1, as proposed in the No Action alternative and Alternative B, will help improve current conditions and expand other shipping operations at the harbor. Under this preferred project alternative, Pier 1 will increase in length to 2,400 feet with 20.5 acres of land serving it and Pier 2 will be extended to 1,200 feet with 28.9 acres of land serving it. Alternative A is fully illustrated in Figure 2.

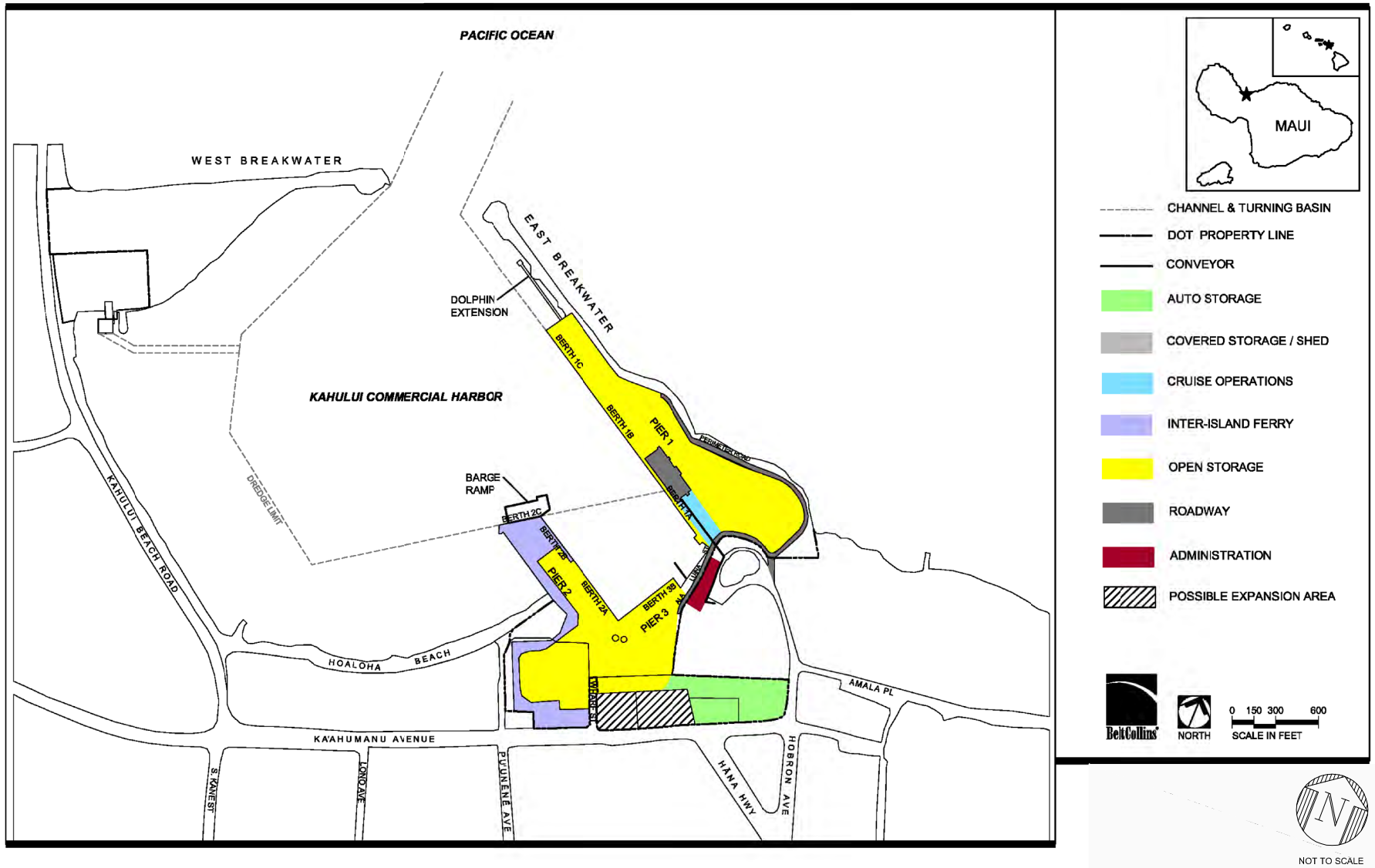

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FIGURE 1
NO ACTION ALTERNATIVE PROJECT DECRIPTION

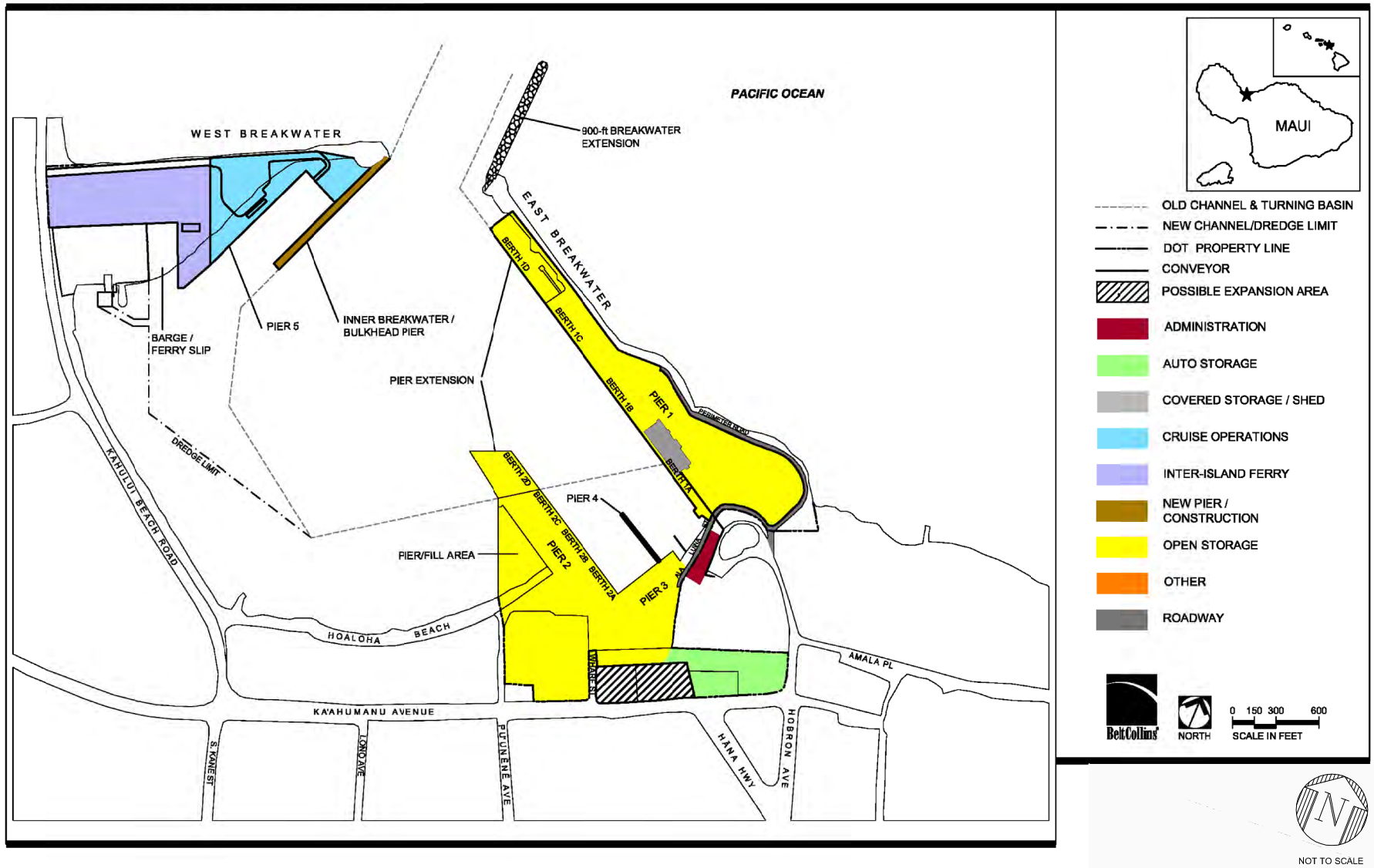

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FIGURE 2
ALTERNATIVE A PROJECT DESCRIPTION

The alternative to the project is also evaluated in this report and is referred to as Alternative B. This project alternative also includes the development of Piers 4 and the West Breakwater and Pier 5. In this scenario, Pier 5 would be used primarily for cargo operations. Pier 5 would be 1,200 feet long with 26 acres for the cargo operations. Pier 2 would be redeveloped to accommodate both the ferry and cruise ship activity. As part of this redevelopment, Pier 2 would be increased in length to 1,200 feet with 6.2 acres available for cruise ship operations. The area dedicated to ferry operations would consist of 4.4 acres and 10.6 acres would be dedicated to cargo operations. The full project description for Alternative B is shown in Figure 3.

STUDY SCOPE

The study analyzed the potential project-related traffic impacts of the 2030 Master Plan buildout on the roadway system in the vicinity of the proposed project site. The impact analysis examined projected future conditions, both with and without the proposed master plan alternatives. To properly analyze future conditions with and without the proposed project, it was necessary to develop a detailed description of existing conditions. The Hawaii Superferry (HSF) has made initial voyages, but has not yet commenced regular service. Daily service is expected to begin in December 2007. Therefore, existing conditions for this project reflect conditions with the HSF in operation. Thus, the following traffic scenarios were analyzed in this study:

- Existing Conditions (2007) - The assessment of existing traffic conditions provides a basis for the remainder of the study. The existing conditions analysis includes an assessment of streets, traffic volumes, and operating conditions with the assumption that the HSF is in operation.

- Cumulative Base (No Action) Conditions (2030) - The objective of this scenario is to project future traffic growth and operating conditions resulting from regional growth and related projects in the vicinity of the project site, without consideration of traffic generated by the proposed project. This scenario is representative of the No Action scenario.

- Cumulative plus Alternative A Conditions (2030) - The objective of this scenario is to project potential impacts of the preferred Master Plan Alternative A on future traffic operating conditions by adding project traffic to the cumulative base (No Action) traffic forecasts in 2030.

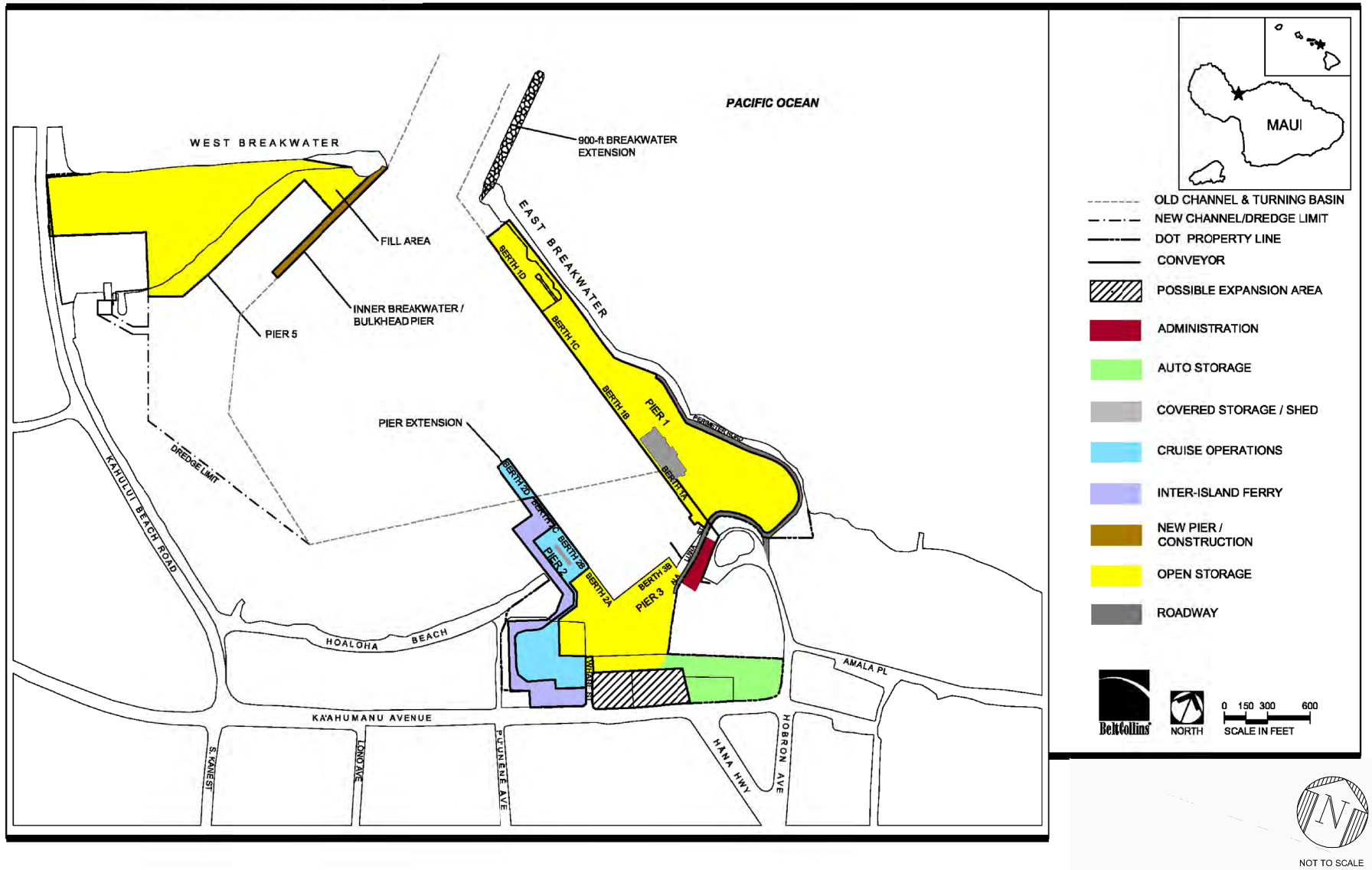

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FIGURE 3
ALTERNATIVE B PROJECT DESCRIPTION

- Cumulative plus Alternative B Conditions (2030) - The objective of this scenario is to project potential impacts of the proposed Master Plan Alternative B on future traffic operating conditions by adding project traffic to the cumulative base (No Action) traffic forecasts in 2030.

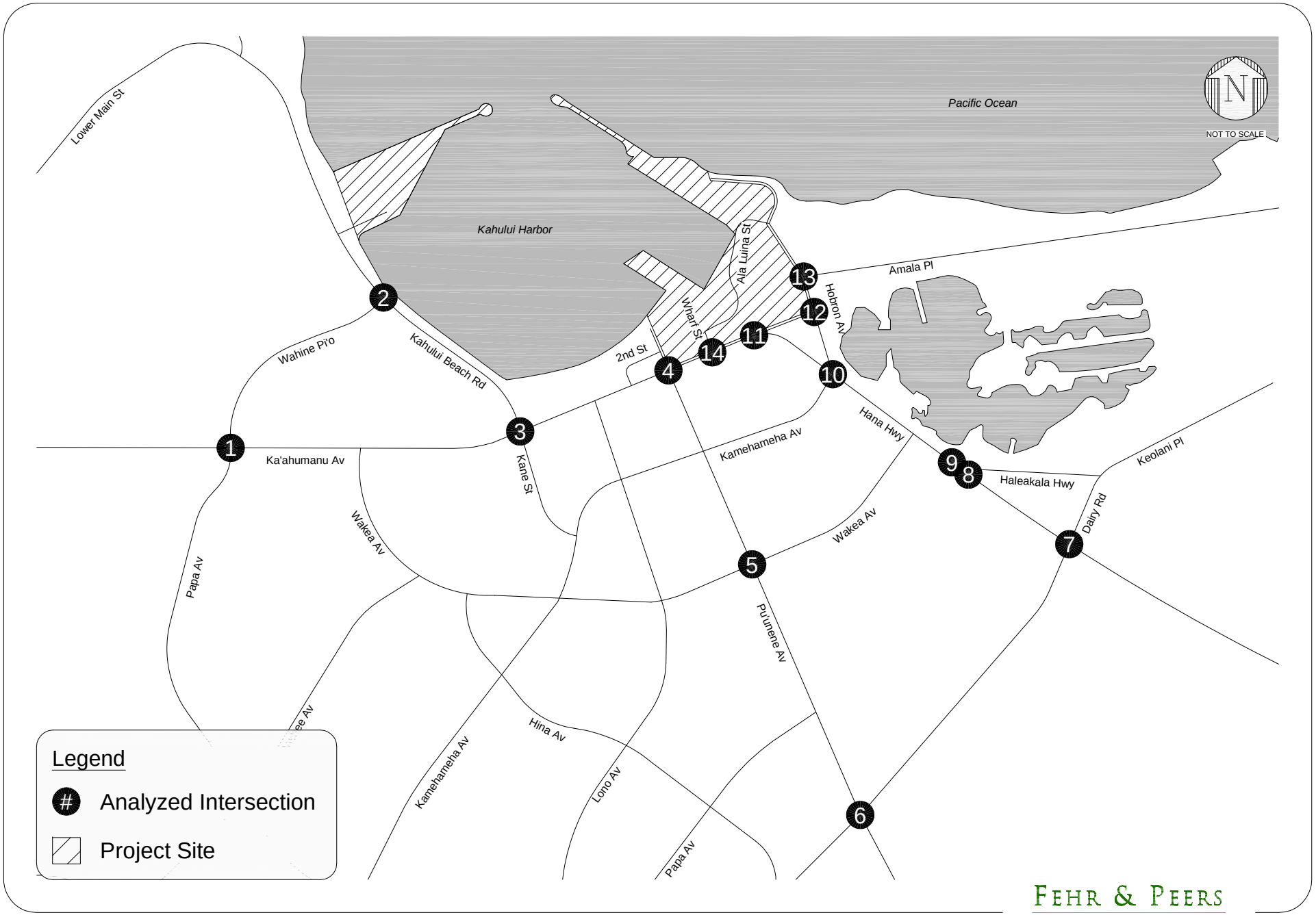
The study analyzed the potential project-related traffic impacts during the typical weekday a.m., mid-morning and p.m. peak hour traffic conditions at 14 intersections in the vicinity of the proposed project site. The analyzed intersections, illustrated in Figure 4, include:

1. Ka'ahumanu Avenue and Papa Avenue/Wahine Pi'o Avenue
2. Wahine Pi'o Avenue and Kahului Beach Road
3. Ka'ahumanu Avenue and Kahului Beach Road/Kane Street
4. Ka'ahumanu Avenue and Pu'unene Road
5. Wakea Avenue and Pu'unene Road
6. Dairy Road/Kuihelani Highway and Pu'unene Road/Mokulele Highway
7. Hana Highway and Dairy Road
8. Haleakala Highway/Hanakai Street and Hana Highway
9. Haleakala Highway and Hana Highway
10. Hana Highway and Kamehameha Avenue/Hobron Avenue
11. Ka'ahumanu Avenue/Hana Highway and Ka'ahumanu Avenue
12. Ka'ahumanu Avenue and Hobron Avenue
13. Amala Place and Hobron Avenue
14. Ka'ahumanu Avenue and Wharf Street

Diagrams of the existing intersection lane configurations at the 14 existing study intersections are provided in Appendix A.

ORGANIZATION OF REPORT

This report is divided into six chapters, including this introduction. Chapter II describes the existing conditions of the study area including a description of the circulation system, traffic volumes on the local streets, operating conditions of these streets, and a discussion of the



FEHR & PEERS
KAKU ASSOCIATES

FIGURE 4
STUDY AREA AND ANALYZED INTERSECTIONS

planned transportation improvements expected to impact the roadways system in the study area. The methodologies used to forecast future traffic conditions and project traffic volumes are described in Chapter III. Chapter IV presents an assessment of potential traffic impacts, identifies the project-specific traffic mitigation measures proposed for Alternative A, the preferred project, and analyzes the effectiveness of these measures. Chapter V provides a discussion of Alternative B, assesses its transportation impacts, and identifies any necessary additional mitigation measures. The results and conclusions of the study are summarized in Chapter VI.

II. EXISTING CONDITIONS

A comprehensive data collection effort was undertaken to identify existing transportation conditions in the vicinity of the proposed project site. The assessment of existing conditions relevant to this study includes an inventory of the street and highway system, current traffic volumes at the key intersections in the study area, and the analysis of the operating conditions at the 14 study intersections.

EXISTING ROADWAY SYSTEM

The project site, shown in Figure 4, is generally bounded by Ka'ahumanu Avenue (Route 32) on the south, Kahului Beach Road (Route 340) on the west, Ala Luina Street/Hobron Avenue/Perimeter Road on the east, and the Kahului Harbor and the Pacific Ocean on the north. Ala Luina and Perimeter Road are both internal harbor streets, and at the time the traffic counts were taken, Ala Luina was closed to through traffic. The street system in the study area, illustrated in Figure 4, includes a series of regional and local roadways. Primary regional access to the area is provided by Hana Highway (Route 36), with access to upcountry Maui and Hana. Mokulele Highway (Route 311) provides access to and from Kihei and the southern areas of Maui, and Kuihelani Highway (Route 380) provides access to west Maui. Pu'unene Avenue and Ka'ahumanu Avenue provide direct access to these highways from the project site.

STREET AND HIGHWAY SYSTEM INVENTORY

The street and highway system inventory for the island includes the primary roadways, collectors and secondary roadways and local streets. Several major highways travel around the island and converge in the Wailuku-Kahului area.

A brief description of the principal roadways serving the study area is provided below:

- Ka'ahumanu Avenue (Route 32) - Ka'ahumanu Avenue is a four-lane major arterial from Naniloa Drive, traveling east, to Kahului Beach Road. Ka'ahumanu Avenue opens up to a six-lane roadway from Kahului Beach Road to east of Wharf Street. The roadway has a raised divided median. Major shopping facilities including the Queen Ka'ahumanu Shopping Center, Kahului Shopping Center, and Maui Mall are serviced by this roadway. Ka'ahumanu Avenue is signalized at Lunalilo Street, Maui Lani Parkway, Kanaloa Avenue/Mahalani Street, South Papa Avenue, South Wakea Avenue, Kahului Beach Road/Kane Street, Lono Avenue, South Pu'unene Avenue, and Wharf Street/Maui Mall. The posted speed limit is 45 miles per hour (mph).

- Wahine Pi'o – Wahine Pi'o is an urban collector from Kahului Beach Road to Ka'ahumanu Avenue. It consists of one lane northbound and one lane southbound from Ka'ahumanu Beach Road to Cameron Way. From Cameron Way to Kahului Beach Road, there is one lane northbound and two lanes southbound. The roadway primarily serves Maui Community College and Keopuolani Park. The roadway contains a raised median from Cameron Way to Kahului Beach Road.

- South Papa Avenue/West Papa Avenue - South Papa Avenue is a three-lane major urban collector (one lane southbound and two northbound) from Ka'ahumanu Avenue to Kea Street. From Kea Street to South Kamehameha Avenue, South Papa Avenue is a two-lane roadway. The area served by South Papa Avenue is primarily residential. The roadway has double yellow striped median and is signalized at Ka'ahumanu Avenue, Onehee Avenue, and South Kamehameha Avenue. South Papa Avenue continues as West Papa Avenue from South Kamehameha Avenue to South Pu'unene Avenue. West Papa is a two-lane road that has a single dashed yellow striped median and is signalized at Pu'unene Avenue. West Papa Avenue provides access to Maui High School. The posted speed limit for South Papa and West Papa Avenues is 30 mph.

- East Wakea/West Wakea Avenue - East Wakea/West Wakea Avenue is a two-lane major urban collector. The roadway provides access to the Kahului Park, residential areas, and commercial areas. Parking is available on both sides of the roadway from Hana Highway to Alamaha Street. East Wakea Avenue is signalized at Ka'ahumanu Avenue, Kea Street, Onehee Avenue, South Kamehameha Avenue, Lono Avenue and Pu'unene Avenue. West Wakea Avenue is signalized at Lono Avenue, Hoohana Street, Alamaha Street, Hana Highway and South Pu'unene Avenue. The median alternates between double yellow and single dashed yellow striping.

- Kamehameha Avenue/South Kamehameha Avenue - Kamehameha Avenue is a two-lane major urban collector from Papa Avenue to Lono Avenue. This roadway segment serves residential areas and the median alternates between single dashed yellow and double yellow striping. From Lono Avenue to Hana Highway, Kamehameha Avenue widens from two to four lanes. The four lanes are separated with a raised median. The four-lane segment primarily provides access to commercial areas. Kamehameha Avenue is signalized at Hana Highway, Alamaha Street, Hoohana Street, Pu'unene Avenue, Lono Avenue, West Wakea Avenue, Hina and South Papa Avenue.

- South Pu'unene Avenue - South Pu'unene Avenue is four-lane major arterial from Ka'ahumanu Avenue to Wakea Avenue. From Wakea Avenue to Puakani Street, the travel lanes are reduced from four to two. South Pu'unene Avenue has a double yellow striped median from Ka'ahumanu Avenue to Puakani Street. The roadway serves commercial and residential areas. South Pu'unene from Puakani Street to north of Kuihelani Highway has two northbound lanes and one southbound lane. The northbound traffic lanes are separated from the southbound by guardrails and trees. South Pu'unene Avenue is signalized at Ka'ahumanu Avenue, Kamehameha Avenue, Wakea Avenue, West Papa Avenue and Kuihelani Highway. The posted speed limit is 30 mph.

- Kahului Beach Road/Waiehu Beach Road (Route 340) - Kahului Beach Road/Waiehu Beach Road is a two lane major arterial. Kahului Beach Road turns into Waiehu Beach Road at East Main Street. Waiehu Beach Road turns into Kahekili Highway at the Waiehu Beach Road and Kahekili Highway junction. The Kahului Beach Road/Waiehu Beach Road serves residential areas and the Kahului Beach Park. The posted speed limit is 30 mph.

- Mokulele Highway (Route 311) - Mokulele Highway is a two-lane major arterial. Mokulele Highway starts from Kuihelani Highway to the North Kihei Road/Piilani Highway junction. The highway has a double yellow striped median. The posted speed limit is 45 miles per hour in the rural areas and 30 mph in Pu'unene town. Mokulele Highway is signalized at Kuihelani Highway.

- Dairy Road/Kuihelani Highway (Route 380) - Dairy Road is a four-lane major arterial that runs from Haleakala Highway (Keolani Place junction) to South Pu'unene Avenue. Dairy Road is signalized at Hana Highway and South Pu'unene Avenue. Dairy Road has a double yellow striped median and the posted speed limit is 30 mph. Dairy Road turns into Kuihelani Highway south of South Pu'unene Avenue. Kuihelani Highway is a two-lane major arterial that ends at Honoapiilani Highway. This portion of the highway runs through an agricultural area. The posted speed limit is 55 mph. Kuihelani Highway is signalized at Honoapiilani Highway.

- Keolani Place - Keolani Place is a four-lane major arterial separated by a double yellow striped median. Keolani Place provides access to the Kahului Airport. The posted speed limit is 30 mph. Keolani Place is signalized at Lanui Circle.

- Hana Highway (Route 36) - Hana Highway is a four-lane major arterial from Ka'ahumanu Avenue to Haleakala Highway (Upcountry junction). Along this segment, the median is raised and the posted speed limit is 45 to 55 mph. From Haleakala Highway (Upcountry junction) to Kaupakalua Road, Hana Highway has two lanes and a double yellow striped median. The posted speed limit along this segment is 35 to 45 mph. Hana Highway begins to narrow in width from Kaupakalua Road to Hana Bay. This segment is rural and mountainous, thus the posted speed limit is 10 to 35 mph. Hana Highway is signalized at Kamehameha Avenue, Dairy Road, Haleakala Highway (Upcountry junction), and Baldwin Avenue.

- Haleakala Highway (Route 37/377) - Haleakala Highway is a two-lane major arterial from Hana Highway (Kanaha Pond) to Hana Highway (Upcountry junction). Haleakala Highway turns into a three-lane highway (two lanes southbound and one lane northbound) from

Hana Highway (Upcountry junction) to Haliimaile Road. The inner southbound lane is used as a contra-flow (reversible) lane. This lane is coned off to operate as a northbound lane in the a.m. peak period, thus increasing the northbound lanes from one to two. During the p.m. peak period, the lane is converted back to a southbound lane. The highway has a double yellow striped median. The posted speed limit is 45 to 55 mph in rural areas and 35 mph in urbanized areas. From Haliimaile Road to Haleakala Crater Road, Haleakala Highway remains a two-lane major arterial. The posted speed limit is 30 mph. Haleakala Highway is signalized at Keolani Place, Hana Highway (Upcountry junction), Fire Break Road, Pukalani Street, and Kula Highway and Makawao Avenue.

EXISTING TRAFFIC VOLUMES AND OPERATING CONDITIONS

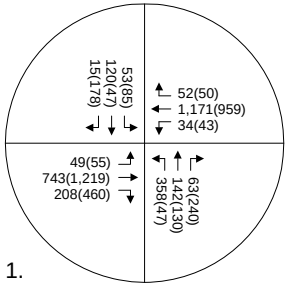
The following sections present the existing peak hour traffic volumes at the study intersections, a description of the methodology used to analyze operating conditions, and the resulting level of service (LOS) at each location under existing conditions.

Existing Peak Hour Traffic Volumes

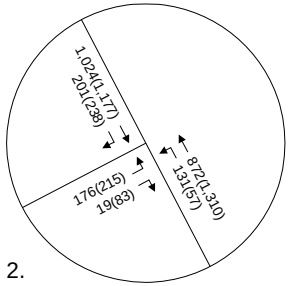
New weekday peak period intersection turning movement counts were collected between 7:00 and 9:00 a.m. and between 3:30 and 5:30 p.m. at the 14 study intersections on Tuesday, April 17, Wednesday, April 18 and Thursday, April 19, 2007 to reflect existing conditions during the morning and afternoon peak period, respectively. The weekday peak hour volumes at the study intersections are illustrated in Figure 5. The detailed traffic count data sheets are provided in Appendix B.

Level of Service Methodology

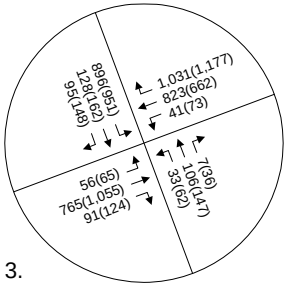
LOS is a qualitative measure used to describe the condition of traffic flow ranging from excellent conditions at LOS A to overload conditions at LOS F. Level of service definitions for signalized and unsignalized intersections are provided in Tables 1 and 2. LOS D is typically considered the minimum acceptable level of service in urban areas.



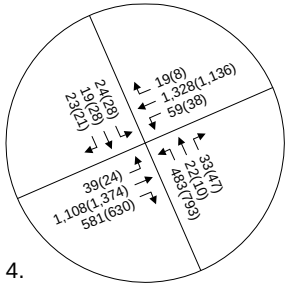
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



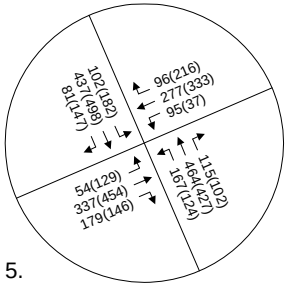
2. Kahului Beach Rd & Wahine Pi'o



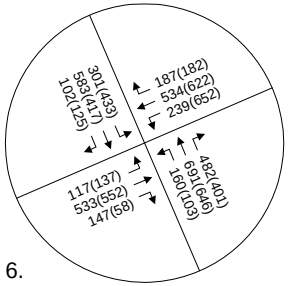
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



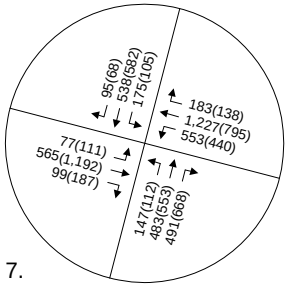
4. Pu'unene Av & Ka'ahumanu Av



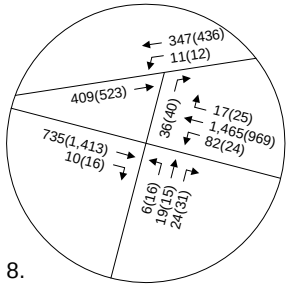
5. Pu'unene Av & Wakea Av



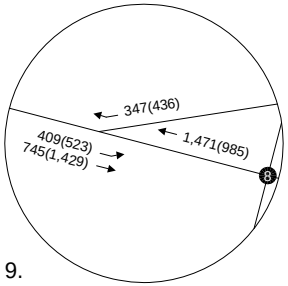
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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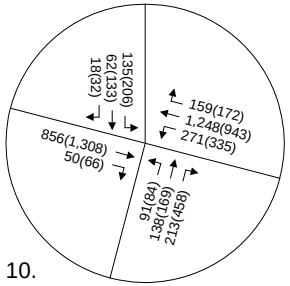
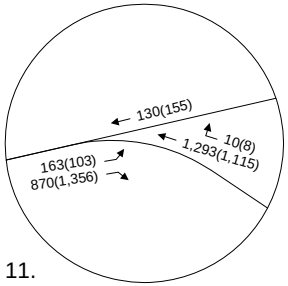
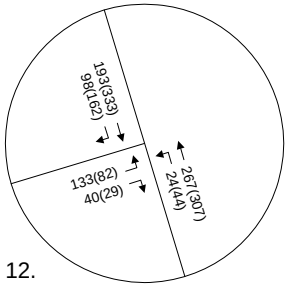


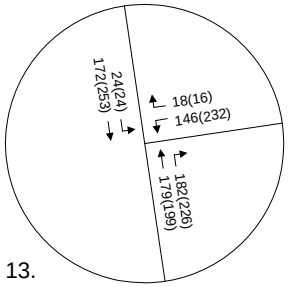
10. Hobron Av/Kamehameha Av & Hana Hwy



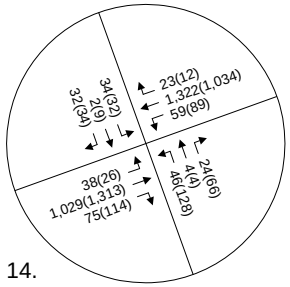
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

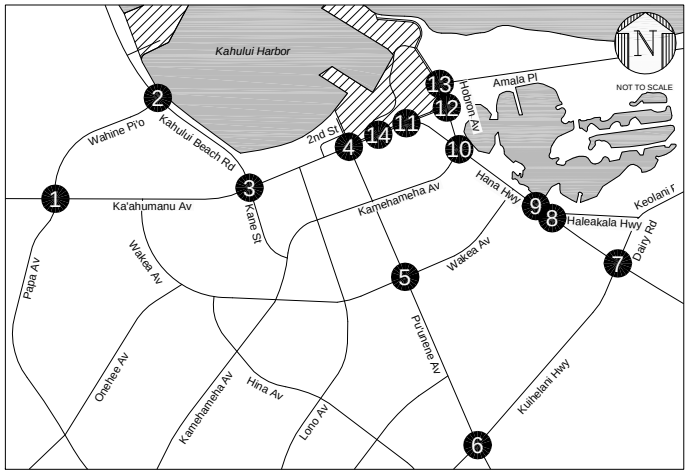


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FIGURE 5
EXISTING PEAK HOUR VOLUMES

LOS analyses were conducted at each of the study intersections to determine existing and future operating conditions using the operations methodology for signalized intersections and the two-way stop-controlled methodology for unsignalized intersections from *2000 Highway Capacity Manual* (2000 HCM) (Transportation Research Board, 2000).

TABLE 1
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

Level of Service	Volume/Capacity	Average Stopped Delay per Vehicle (seconds)*
A	0.000 - 0.600	≤10
B	>0.600 - 0.700	>10 and ≤20
C	>0.700 - 0.800	>20 and ≤35
D	>0.800 - 0.900	>35 and ≤55
E	>0.900 - 1.000	>55 and ≤80
F	> 1.000	>80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

TABLE 2
LEVEL OF SERVICE DEFINITIONS FOR UNSIGNALIZED INTERSECTIONS

Level of Service	Average Total Delay (seconds/vehicle)
A	≤ 10.0
B	> 10.0 and ≤ 15.0
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	> 50.0

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

Existing Peak Hour Intersection Levels of Service

The existing weekday morning and afternoon peak hour turning movements illustrated in Figure 5 were analyzed using the methodologies described above to determine existing operating conditions at each of the 14 study intersections including volume-to-capacity (V/C) ratios, average intersection delay per vehicle, and the corresponding level of service (LOS) for each. Detailed calculation worksheets documenting how each of the operating conditions was determined are included in Appendix C.

Table 3 summarizes the results of the analysis conducted at the 14 locations in the study area to assess the existing operating conditions. This table includes the results of the V/C ratio and LOS calculations for the nine signalized intersections and the average control delay and corresponding LOS for the five unsignalized study intersections during the typical weekday a.m. and p.m. peak hours. As indicated in Table 3, four of the 14 study intersections are operating at LOS E during one of the peak hours under existing conditions:

- Dairy Road & Pu'unene Avenue/Mokulele Highway
- Haleakala Highway/Hanakai Street & Hana Highway
- Haleakala Highway & Hana Highway
- Hobron Avenue & Amala Place

The remaining 10 study intersections are operating at LOS D or better during each of the peak periods.

POTENTIAL ALTERNATIVE PEAK HOUR

As indicated above, the street system that serves the Kahului Harbor exhibits traffic flow conditions that are typical of most urban areas, with peak volumes occurring during the morning peak period between 7:00 and 9:00 a.m. and the evening peak period between 3:30 and 5:30 p.m. The opening of the Hawaii Superferry, however, could result in traffic generation in the specific area of the harbor that could alter the peaking characteristics of the traffic volumes in the area. The HSF is projected to load and unload its passengers and vehicles each day during the mid-morning period between 9:30 and 10:30 a.m. Traffic generated by HSF operations would include passengers with their own vehicles expecting to embark, vehicles bringing passengers without vehicles, and vehicles picking up passengers without vehicles all arriving at the terminal before the 9:30 to 10:30 a.m. load/unload period, and passengers with their vehicles disembarking and vehicles dropping off or picking up passengers without vehicles leaving the area during and after the 9:30 to 10:30 a.m. load/unload period of the HSF. The potential effect of this traffic on operations in the area was assessed to determine if the mid-morning peak period with the addition of HSF-generated traffic would result in higher volumes and worse operating conditions than in the traditional morning peak period.

TABLE 3
YEAR 2007 CONDITIONS
PEAK HOUR LEVELS OF SERVICE

Intersections	Control	Peak Hour	Del/Veh[1]	LOS
1. Ka'ahumanu Av & Papa Av/Wahine Pi'o	Signalized	A.M. P.M.	23.8 18.8	C B
2. Wahine Pi'o & Kahului Beach Rd	Signalized	A.M. P.M.	10.7 10.7	B B
3. Ka'ahumanu Av & Kahului Beach Rd/Kane St	Signalized	A.M. P.M.	22.8 39.6	C D
4. Ka'ahumanu Av & Pu'unene Av	Signalized	A.M. P.M.	19.3 29.5	B C
5. Wakea Av & Pu'unene Av	Signalized	A.M. P.M.	27.0 29.3	C C
6. Dairy Rd & Pu'unene Av/Mokulele Hwy	Signalized	A.M. P.M.	32.9 55.7	C E
7. Dairy Rd & Hana Hwy	Signalized	A.M. P.M.	29.6 33.7	C C
8. Haleakala Hwy/Hanakai St & Hana Hwy	Side-Street Stop	A.M. P.M.	41.0 32.0	E D
9. Haleakala Hwy & Hana Hwy	Side-Street Stop	A.M. P.M.	37.0 7.0	E A
10. Hobron Av/Kamehameha Av & Hana Hwy	Signalized	A.M. P.M.	22.4 37.9	C D
11. Ka'ahumanu Av/Hana Hwy & Ka'ahumanu Av	Side-Street Stop	A.M. P.M.	12.0 14.0	B B
12. Hobron Av & Ka'ahumanu Av	Side-Street Stop	A.M. P.M.	17.0 24.3	C C
13. Hobron Av & Amala Pl	Side-Street Stop	A.M. P.M.	20.0 46.0	C E
14. Ka'ahumanu Av & Wharf St	Signalized	A.M. P.M.	6.7 11.4	A B

Note:
1 Delay indicates average stopped delay per vehicle in seconds for signalized intersections. For stop-controlled intersections delay is shown for the worst-case intersection approach.

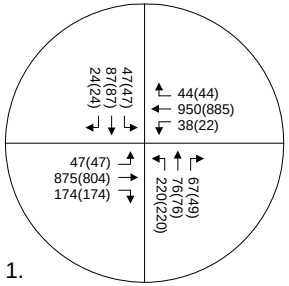
The first step in this process of establishing a third peak hour during the mid-morning peak period was to conduct traffic counts at each of the 14 study intersections. Figure 6 illustrates the peak hour counts for the 9:30 to 10:30 a.m. mid-morning peak hour.

HSF Traffic Generation

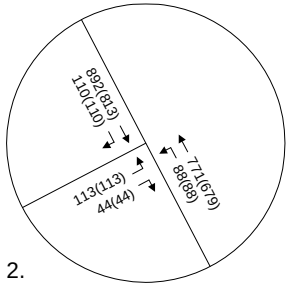
Data from *Traffic Study for Kahului Ferry Terminal* (CH2M Hill, November 2006) was used to develop traffic generation estimates for the ferry. Vehicle demand for the Superferry is projected on a weekly basis varying by day of week. Based on these projections, the average daily vehicles are estimated at 110. The peak day is estimated at 153 vehicles. The HSF also estimates that the maximum number of vehicles is 360. This estimate is not a forecast of the maximum expected number of vehicles, but is merely an estimate of the maximum number of vehicles that can physically fit on the ferry. These estimates were converted into peak hour vehicle trips using the following assumptions:

1. Other than the exception noted in item 5 below, all traffic generated by loading and unloading of vehicles and passengers would occur in one hour.
2. Passengers with vehicles boarding the ferry would generate one vehicle trip per passenger in the inbound (toward the harbor) direction.
3. Passengers with vehicles disembarking from the ferry would generate one vehicle trip per passenger in the outbound direction.
4. Loading and unloading passengers without vehicles would generate two vehicle trips per passenger, one trip inbound and one outbound.
5. Only 90 percent of the passengers loading onto the ferry (both with and without vehicles) would arrive at the harbor during the peak hour.

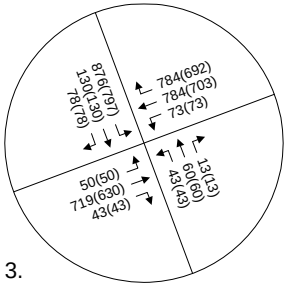
The above data was used to develop the traffic generation estimates for the Hawaii Superferry. As shown in Table 4, the average number of trips generated by the HSF on a daily basis is estimated at 267 vehicles per hour (vph). The weekday maximum is projected to be 371 vph and the absolute theoretical maximum traffic is 684 vph.



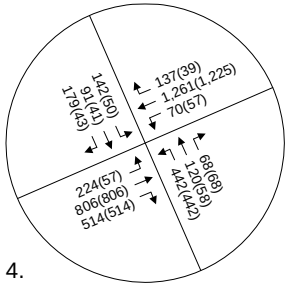
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



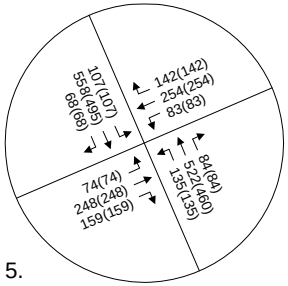
2. Kahului Beach Rd & Wahine Pi'o



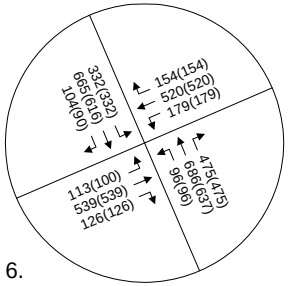
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



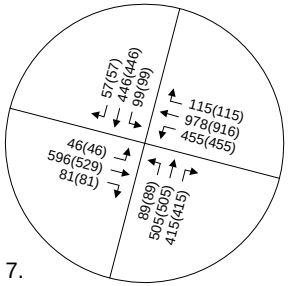
4. Pu'unene Av & Ka'ahumanu Av



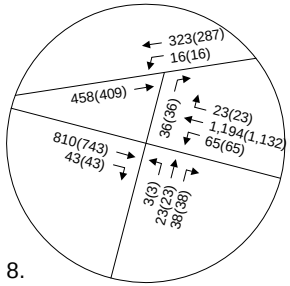
5. Pu'unene Av & Wakea Av



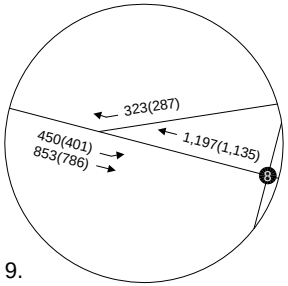
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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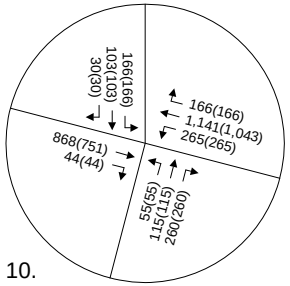

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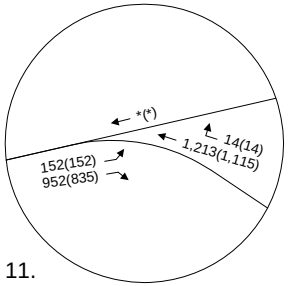
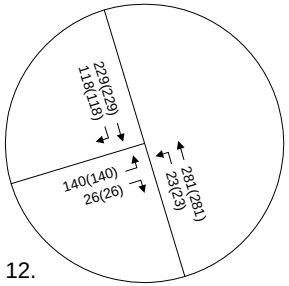
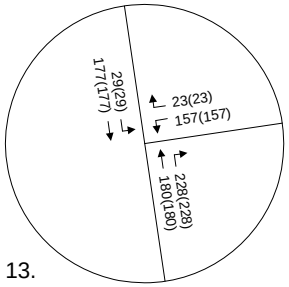


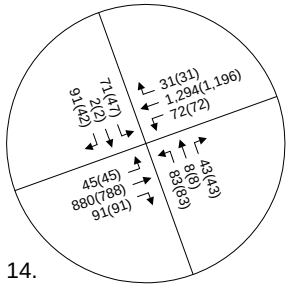
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - Mid AM count + HSF(mid AM count)

*(*) - Negligible Volumes

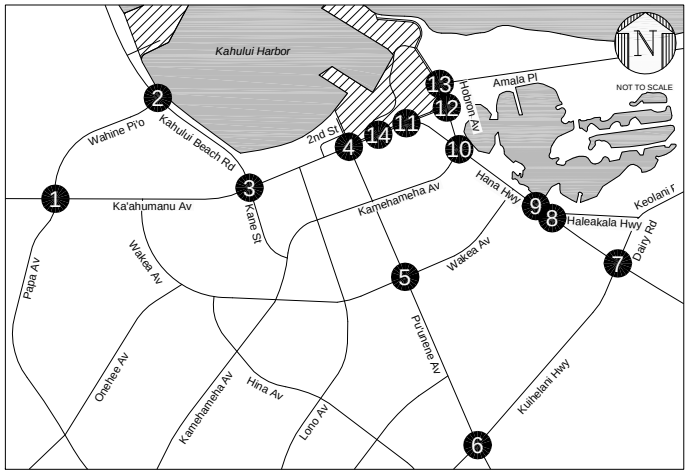


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FIGURE 6

EXISTING MID MORNING PEAK HOUR VOLUMES WITH HAWAII SUPERFERRY

TABLE 4

HSF TRIP GENERATION FORECASTS

HSF Scenario	Trip Generation (Vehicles)		
	Inbound	**Outbound**	**Total**
Projected Weekday Average	128	139	267
Projected Weekday Maximum	178	193	371
Absolute Theoretical Maximum	328	356	684

Impact of HSF Traffic on Traffic Operations

The traffic generated by the HSF was added to the mid-morning traffic counts illustrated in Figure 6 to develop an estimate of mid-morning peak hour traffic conditions with the HSF in operation. Future forecasts of mid-morning traffic conditions were developed using traffic generation forecasts for all three scenarios indicated in Table 4 above. Volume/capacity analyses were conducted at each of the 14 study intersections for each of the three scenarios to assess the impact of the future HSF traffic. The results of the analysis for the intersection of Ka'ahumanu Avenue & Pu'unene Avenue are presented below. The results indicate that the addition of HSF traffic would result in this intersection operating at LOS C if the average and projected weekday maximum vehicle forecasts are used and at LOS D if the absolute theoretical maximum number of vehicles is used.

Operating conditions at the intersection of Ka'ahumanu Avenue and Pu'unene Avenue with the addition of HSF traffic during the mid-morning peak hour are as shown below:

Vehicle Trip Generation Scenario for HSF	LOS During Mid-Morning Peak Hour
Projected Weekday Average	C
Projected Weekday Maximum	C
Absolute Theoretical Maximum	D

Although the projected weekday maximum serves as the most realistic “worst case” forecast for the HSF, the absolute theoretical maximum was used in the Ch2M Hill document to conduct its traffic studies for the HSF. Therefore, this study is based on traffic forecasts developed with the use of the absolute theoretical maximum vehicle forecasts for the HSF. Figure 6 illustrates the existing base traffic for the study area under the assumption that HSF is in operation using these patronage forecasts. Table 5 summarizes the results of the V/C analysis for the 14 study intersections for the existing base mid-morning peak hour. All 14 intersections operate at LOS D or better under these conditions.

EXISTING TRANSIT SERVICE

The Maui Bus public transit service consists of eight bus routes, all of which are contracted to and operated by Roberts Hawaii. The eight routes, funded by the County of Maui, provide transportation service in and between various Central, South, West, and Upcountry Maui communities. All of the routes are operated seven days a week, including all holidays. Fares on the Kahului and Wailuku Loops are free. All other routes cost $1.00 per boarding.

The Kahului Loop Route #5 consists of 15 bus stops at various residential, retail and commercial areas. It is a circular route that uses the Queen Ka'ahumanu Center as its hub. This route provides connections to destinations in the Wailuku area. The route starts at the Queen Ka'ahumanu Center and departs the mall via Wal Mart, the Maui Marketplace, Safeway, Ross, and Kmart along Dairy Road. The route then takes a left onto Haleakala Highway and merges onto Hana Highway. The route then makes a stop at Maui Mall directly across from the harbor. The loop exits the mall via a left turn onto Ka'ahumanu Avenue and eventually re-enters the Queen Ka’ahumanu Center. The route duration is one hour, with service beginning at 7:30 a.m., and the final bus leaves at 8:30 p.m. The Kahului Loop Route #6 serves the same route as Kahului Loop Route #5 but operates in the reverse direction, leaving half an hour after Route #5. Kahului Loop Route #6 starts service at 8:00 a.m. and the final bus is at 9:00 p.m.

Beginning July 1, 2007, the County of Maui indicates that the Maui Bus will expand its bus service. This service will add to the existing Maui Bus service described above, not replace it. This increase in service will consist of five commuter routes, all operated by Roberts Hawaii.

TABLE 5
YEAR 2007 CONDITIONS WITH HAWAII SUPERFERRY
MID-MORNING PEAK HOUR LEVELS OF SERVICE

Intersections	Control	Peak Hour	Del/Veh[1]	LOS
1. Ka'ahumanu Av & Papa Av/Wahine Pi'o	Signalized	Mid-A.M.	18.6	B
2. Wahine Pi'o & Kahului Beach Rd	Signalized	Mid-A.M.	8.7	A
3. Ka'ahumanu Av & Kahului Beach Rd/Kane St	Signalized	Mid-A.M.	22.1	C
4. Ka'ahumanu Av & Pu'unene Av	Signalized	Mid-A.M.	42.3	D
5. Wakea Av & Pu'unene Av	Signalized	Mid-A.M.	25.3	C
6. Dairy Rd & Pu'unene Av/Mokulele Hwy	Signalized	Mid-A.M.	30.8	C
7. Dairy Rd & Hana Hwy	Signalized	Mid-A.M.	23.8	C
8. Haleakala Hwy/Hanakai St & Hana Hwy	Side-Street Stop	Mid-A.M.	31.0	D
9. Haleakala Hwy & Hana Hwy	Side-Street Stop	Mid-A.M.	11.0	B
10. Hobron Av/Kamehameha Av & Hana Hwy	Signalized	Mid-A.M.	22.1	C
11. Ka'ahumanu Av/Hana Hwy & Ka'ahumanu Av	Side-Street Stop	Mid-A.M.	13.0	B
12. Hobron Av & Ka'ahumanu Av	Side-Street Stop	Mid-A.M.	18.0	C
13. Hobron Av & Amala Pl	Side-Street Stop	Mid-A.M.	24.0	C
14. Ka'ahumanu Av & Wharf St	Signalized	Mid-A.M.	9.4	A

Note:
1 Delay indicates average stopped delay per vehicle in seconds for signalized intersections. For stop-controlled intersections delay is shown for the worst-case intersection approach.

The routes are called the Haiku-Wailea Commuter, Makawao-Kapalua Commuter, Wailuku-Kapalua Commuter, Kihei-Kapalua Commuter, and Wailuku-Kahului Connector. The one-way fare for all of these routes will be $1.00.

III. FUTURE TRAFFIC PROJECTIONS

To evaluate the potential impact of traffic generated by the implementation of the proposed Kahului Harbor Master Plan on the surrounding street system, it was necessary to develop estimates of future traffic conditions in the area both with and without the project. Future traffic conditions without the proposed project reflect traffic increases due to general regional growth and development as well as traffic increases generated by other specific developments in the vicinity of the project site. These conditions are referred to as the cumulative base conditions and reflect future conditions without the project and are representative of the No Action conditions. The addition of the project-generated traffic to the cumulative base represents the cumulative plus project alternative conditions, i.e., future conditions with the project.

The development of the traffic conditions that represent the future 2030 traffic scenarios is described in this chapter.

CUMULATIVE BASE TRAFFIC PROJECTIONS

The cumulative base traffic projections normally include two elements of growth in traffic over existing conditions. The first element is growth in the background traffic volumes reflecting the effects of overall regional growth and development in and around the study area. This is referred to as ambient growth. The second is the traffic generated by specific cumulative projects in or near the study area.

Areawide Traffic Growth

Trends in areawide growth and development in an area for specific highways are normally based on trends in historical traffic count data. However, long-term (to year 2030) traffic projections are available for the entire island of Maui in the form of a Maui Islandwide transportation demand

forecasting model developed for the County as part of a long-range transportation planning effort. The development of the model, which was also used in the development of the Maui County Traffic Impact Fee Program, is fully documented in *Maui Island Traffic Impact Fee Report and Comprehensive Roadway Master Plan* (Kaku Associates, November 2006). Traffic demand forecasts on the three main arterial streets (Ka'ahumanu Avenue, Hana Highway and Pu'unene Avenue) in the study area were assessed using data from the model. The County of Maui transportation travel demand model provided average yearly growth factors for each of the three major highways in the area. These factors, summarized below in Table 6, indicate that the annual growth rates for both Ka'ahumanu Avenue and Hana Highway are projected to be less than 1 percent per year for both the morning and afternoon peak hours. The rates for Pu'unene Avenue are almost 3 percent per year for the morning peak hour and almost 2 percent per year for the evening peak hour.

TABLE 6
PEAK HOUR GROWTH FACTORS

Location	A.M. Peak Hour		P.M. Peak Hour	
	Annual Growth Rate	Total Growth applied to 2030	Annual Growth Rate	Total Growth applied to 2030
Ka'ahumanu Avenue	0.7%	16%	0.4%	9%
Hana Highway	0.4%	9%	0.4%	9%
Pu'unene Avenue	2.7%	62%	1.6%	37%

Note: Mid-morning peak hour assumes the same growth as a.m. peak hour.

These growth factors, which were verified to be consistent with trends in historical rates of growth in actual traffic volumes counted in the area, were developed using land use forecasts for the entire island. These forecasts not only combine both elements normally used to forecast traffic in an area, i.e., growth trends and specific development projects in the study area, but use of the travel demand model includes all developments on the entire island of Maui. Therefore, applying any other growth factors to develop future forecasts that represent the cumulative base conditions is not necessary.

Cumulative Base (No Action) Traffic Volumes

The cumulative base traffic projections were developed by first applying the appropriate year 2030 growth factors to the existing traffic volumes at each of the 14 study intersections. Once again, adding the traffic volumes (theoretical maximum trip generation) generated by the ferry operations to the street system was necessary to appropriately reflect Year 2030 conditions without the project, the harbor master plan.

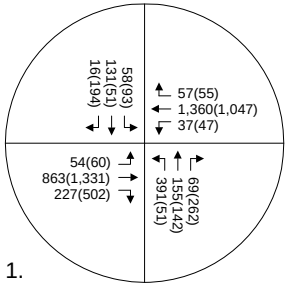
The resulting traffic volumes, illustrated in Figures 7A and 7B, represent the Year 2030 cumulative base, i.e., the future without project or the No Action conditions.

PROJECT TRAFFIC PROJECTIONS

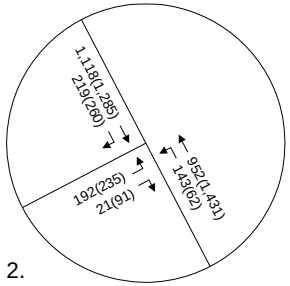
In order to develop forecasts of future conditions with the proposed project, it was necessary to develop estimates of the project traffic generation. Development of traffic projections for the Kahului Harbor Master Plan involved a three-step process. This process included estimates of the project trip generation, forecasts of the geographic distribution of these trips, and the assignment of these trips to the local street system.

Project Trip Generation

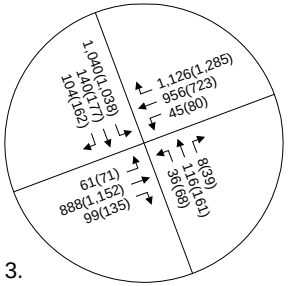
The conventional approach to trip generation involves the use of trip generation rates found in *Trip Generation, 7th Edition* (Institute of Transportation Engineers, 2003). For this study, ITE rates were not appropriate, as no trip generation estimates for the specific land uses associated with Kahului Harbor have been collected. Instead, traffic count data was collected at the primary driveways of the current harbor to develop an estimate of the current volume of traffic generated by the different uses at the harbor. This process led to the development an empirical trip generation rate specific to the Kahului Harbor and the uses at the harbor.



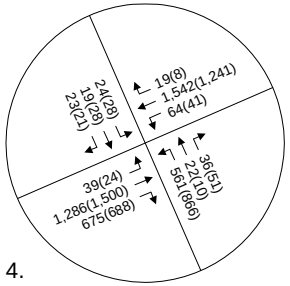
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



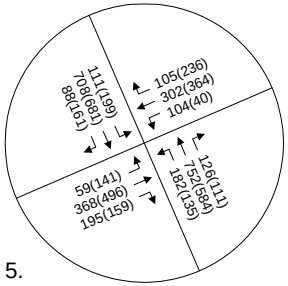
2. Kahului Beach Rd & Wahine Pi'o



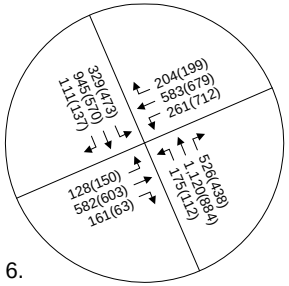
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



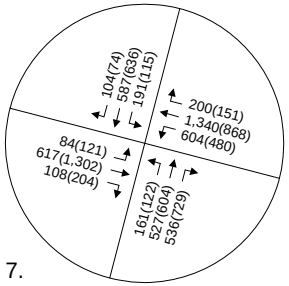
4. Pu'unene Av & Ka'ahumanu Av



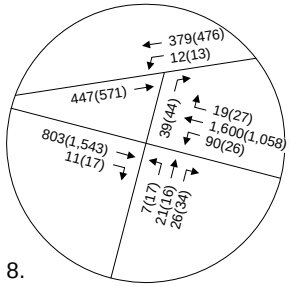
5. Pu'unene Av & Wakea Av



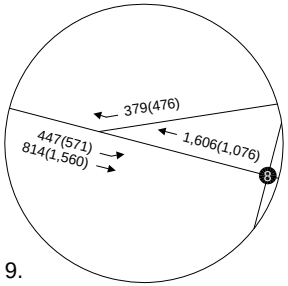
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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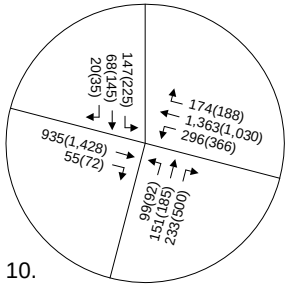
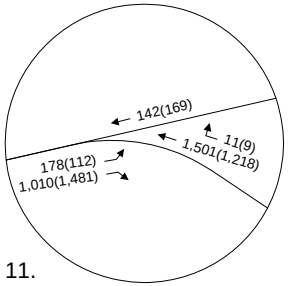
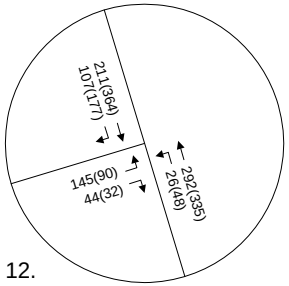


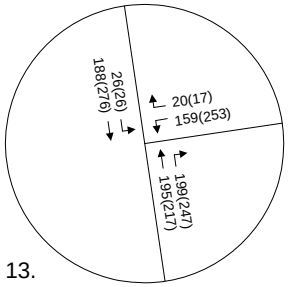
10. Hobron Av/Kamehameha Av & Hana Hwy



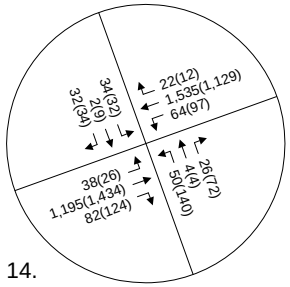
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

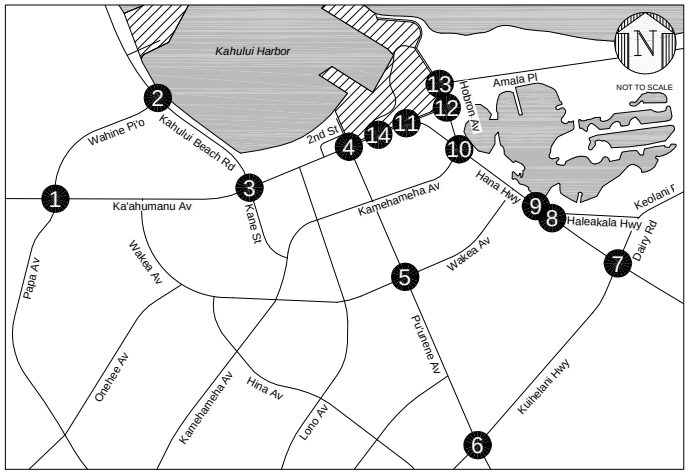


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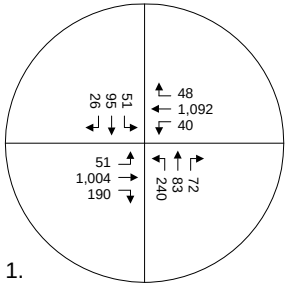
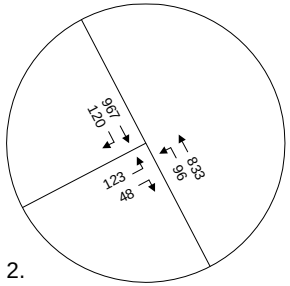
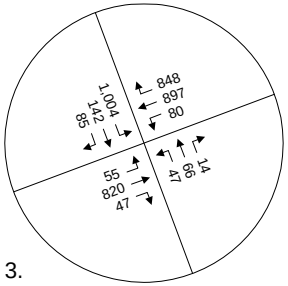
FIGURE 7A
CUMULATIVE BASE PEAK HOUR VOLUMES



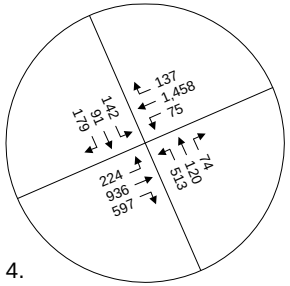
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



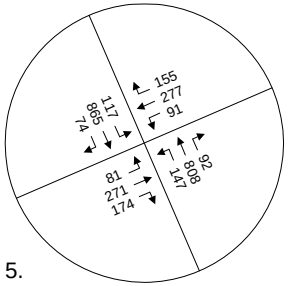
2. Kahului Beach Rd & Wahine Pi'o



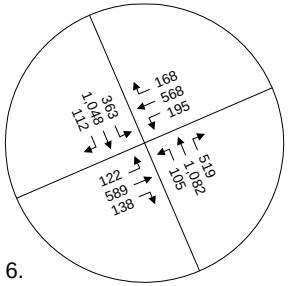
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



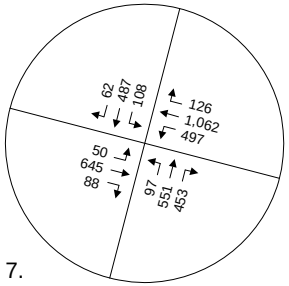
4. Pu'unene Av & Ka'ahumanu Av



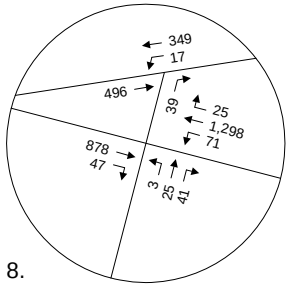
5. Pu'unene Av & Wakea Av



6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



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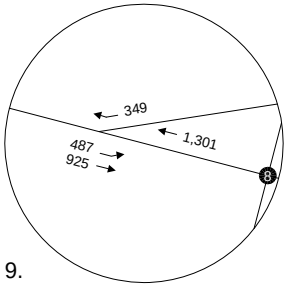
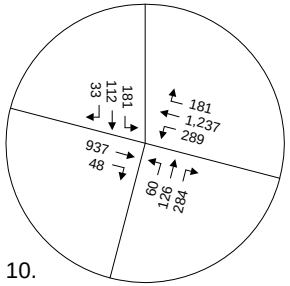
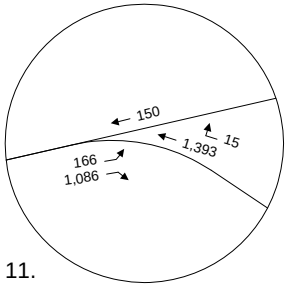


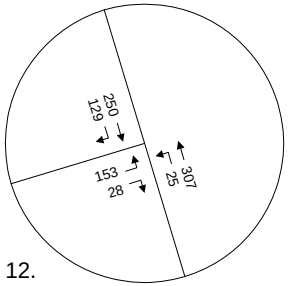
9. Haleakala Hwy/Hanakai St & Hana Hwy



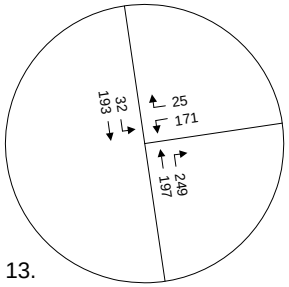
10. Hobron Av/Kamehameha Av & Hana Hwy



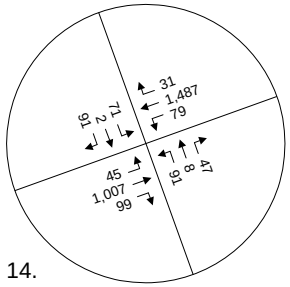
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

- Mid-Morning Volumes

* - Negligible Volumes

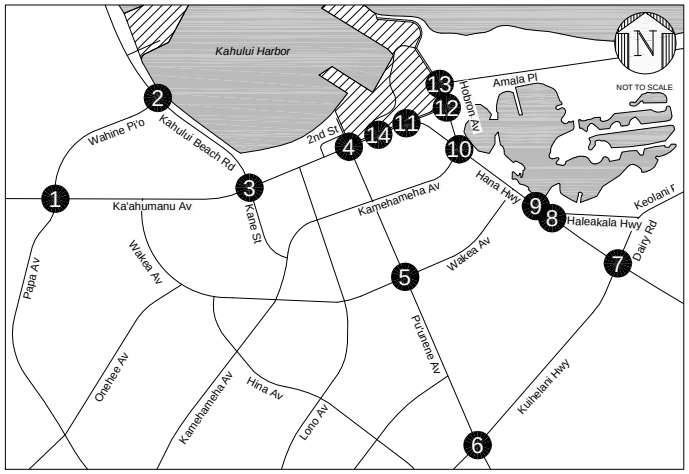


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FIGURE 7B
CUMULATIVE BASE MID-MORNING PEAK HOUR VOLUMES

Existing Harbor Trip Generation

The port operators and activities were grouped into four main categories: barge cargo, Pier 1/3 cargo, cruise ships, and the HSF. These separate groups each broadly represent different patterns, types and volumes of vehicular movement to support their activities. The first two represent the major shipping operators at the port for cargo including building materials, manufactured goods, vehicles, etc. Barge cargo operations also includes Less than Container Load (LCL) shipping, which allows for small and medium size shipping, down to pallet size, for smaller operators. For purposes of this analysis, Pier 1/3 cargo activities include the occasional energy, sugar, sand and other miscellaneous operations, some of which require very little external vehicular support (e.g., sugar) and occur on a limited basis either once a week (e.g., sand) or once a month (e.g., scrap metal, dry cement, fuel, propane). Cruise ship operations mainly consist of moving of tourists to various points of interest around the islands of the state and are served by taxis, tour buses and rental-car shuttle vans in roughly equal proportions. Currently, these operations are on Pier 1 next to Pier 1/3 cargo shipping operations and occur six days a week with three ships each docked for two full days. The HSF has made initial voyages, but has not yet commenced regular service. Daily service is to begin in December 2007. Separating out trips generated by these main operators is necessary because of the need to accommodate the varying configurations of future port expansion alternatives.

Trips generated by the current operation of the barge cargo, Pier 1/3 cargo and the cruise ships were estimated from intersection driveway traffic counts collected on a Tuesday and Wednesday, April 17-18, 2007. These dates were specifically chosen with the assistance of the different harbor operators to capture a representative cross-section of activities generated by shipping and cruise ship related operations. The current port configuration restricts vehicles entering and exiting the barge cargo area to Wharf Street only. Thus, Hobron Avenue acts as the main access point for vehicles serving Pier 1/3 cargo, cruise ships and any other miscellaneous operations. In addition, vehicle classifications were included in volume counts to distinguish between automobiles and various sizes of trucks that reflect these operations. As noted, trips generated by the HSF are derived from *Traffic Study for Kahului Ferry Terminal*, and represent a theoretical maximum trip generation. Existing port trip generators and the HSF are summarized in Table 7. The a.m. peak hour occurred between 7:00 and 9:00 a.m., mid-morning between 9:30 and 10:30 a.m. (representing the peak hour of HSF operations), and afternoon between 3:30 and 5:30 p.m.

TABLE 7
EXISTING OPERATING CONDITIONS PLUS HSF
VEHICLE TRIPS GENERATED

Port Operator	A.M. Peak Hour			Mid-A.M. Peak Hour			P.M. Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Barge Cargo	61	66	127	76	89	165	38	66	104
Pier 1/3 Cargo	112	117	229	143	155	298	172	207	379
Cruise Related	79	59	138	69	63	132	66	85	151
Hawaii Superferry	0	0	0	328	356	684	0	0	0
TOTAL	252	242	494	616	663	1,279	276	358	634

As shown in Table 7, the existing vehicular activity at the harbor varies from 494 vehicle trips during the morning peak hour (252 inbound and 242 outbound) and approximately 634 vehicle trips during the evening peak hour (276 inbound and 358 outbound). The mid-morning peak was also examined, with a total of approximately 1,279 trips being generated (616 inbound and 663 outbound), with about half, or 684 vph (328 inbound and 356 outbound) generated by a theoretical maximum number of vehicles for the HSF.

Future Trip Generation by Master Plan

The two alternative scenarios proposed for the Kahului Harbor Master Plan provide different uses for internal harbor land. Both scenarios provide the capacity for expansion of shipping and cargo operations (as described in Chapter I), whereas the No Action scenario would keep the existing configuration. This chapter is directed at traffic impacts of the preferred Master Plan Alternative A only.

The estimates of future vehicular traffic entering and exiting the harbor area were developed after reviewing the details of proposed land use plans, conversing with harbor officials, and studying current local land uses. These discussions were necessary to identify constraints and issues that prevent the use of a direct relationship between growth in harbor use of land and increased activity, and the growth in peak hour traffic volumes, e.g., the expansion of berth space versus

expansion of storage area. While more ships may be able to dock at an expanded pier, sufficient storage space to allow for overlapping loading and unloading of goods must be provided. Additionally, limited growth on the island itself over next 20 years restricts the demand for materials, vehicles and energy products. Finally, future plans do not include more than one cruise ship docked during the day and any increase in ferry operations is projected for evening hours well outside the afternoon peak hour, resulting in no impact on peak hours of travel.

Trip Generation for the Preferred Alternative A

Under Alternative A, all the cruise and ferry operations will be moved away from existing piers onto a newly created Pier 5 on the new West Breakwater. Both of these uses are expected to operate similarly to 2007 conditions. No additional ferries or cruise ships are planned during the primary travel hours of the day; thus, no additional vehicular trips are expected to be generated. However, the transfer of these operations to Pier 5 will free up both berth and storage space for the shipping and cargo, notably for cargo and barge operations, on Piers 1, 2 and 3. This alternative includes an expansion of the berth length and storage area on Pier 1 of 45% and 14%, respectively. Pier 2 would also expand berth length and storage area by 34% and 38%, respectively. The addition of Pier 4 for energy uses is not expected to add any significant daily vehicular trips. The estimated increase in vehicle trips generated by the changes to the harbor as proposed in Alternative A is summarized in Table 8.

TABLE 8
MASTER PLAN ALTERNATIVE A TRIP GENERATION
(INCREMENTAL INCREASE IN TRIPS IN YEAR 2030)

Port Operator	A.M. Peak Hour			Mid-A.M. Peak Hour			P.M. Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Barge Cargo	24	26	50	30	36	66	15	26	41
Pier 1/3 Cargo	28	29	57	36	39	75	43	52	95
Cruise Related	0	0	0	0	0	0	0	0	0
Ferry	0	0	0	0	0	0	0	0	0
TOTAL	52	55	107	66	75	141	58	78	136

The implementation of Alternative A would result in an increase in peak hour traffic of 107 vph during the morning peak hour, 141 vph during the mid-morning peak hour, and 136 vph during the evening peak hour.

Project Trip Distribution and Trip Assignment

Factors considered in the development of the project trip distribution included a review of historic traffic volume data in the area, observations of existing traffic patterns, and the geographic distribution of industrial/commercial activity on Maui. Based on these factors, trip distribution patterns were developed for the different harbor uses. In general, the barge cargo and its operations represent more of an islandwide distribution because they deal with smaller shipments to commercial and retail operations. Pier 1/3 cargo deals with larger shipments generally directed at industrial areas and has a more local distribution because a majority of industrial development is close to Kahului. Figure 8 represents the barge cargo and other harbor uses that have an islandwide impact, and Figure 9 represents Pier 1/3 cargo and other harbor uses with a more local impact.

Figures 10A and 10B illustrate the assignment of new project-related traffic at each study intersection for the preferred Master Plan Alternative A using these two distribution patterns.

CUMULATIVE PLUS PROJECT (ALTERNATIVE A) TRAFFIC PROJECTIONS

The project-generated traffic volumes were added to the cumulative base No Action traffic projections to develop the cumulative plus project Alternative A traffic forecasts for 2030. Figures 11A and 11B illustrate the projected cumulative plus project a.m. and p.m. peak hour traffic volumes at each of the 14 study intersections.

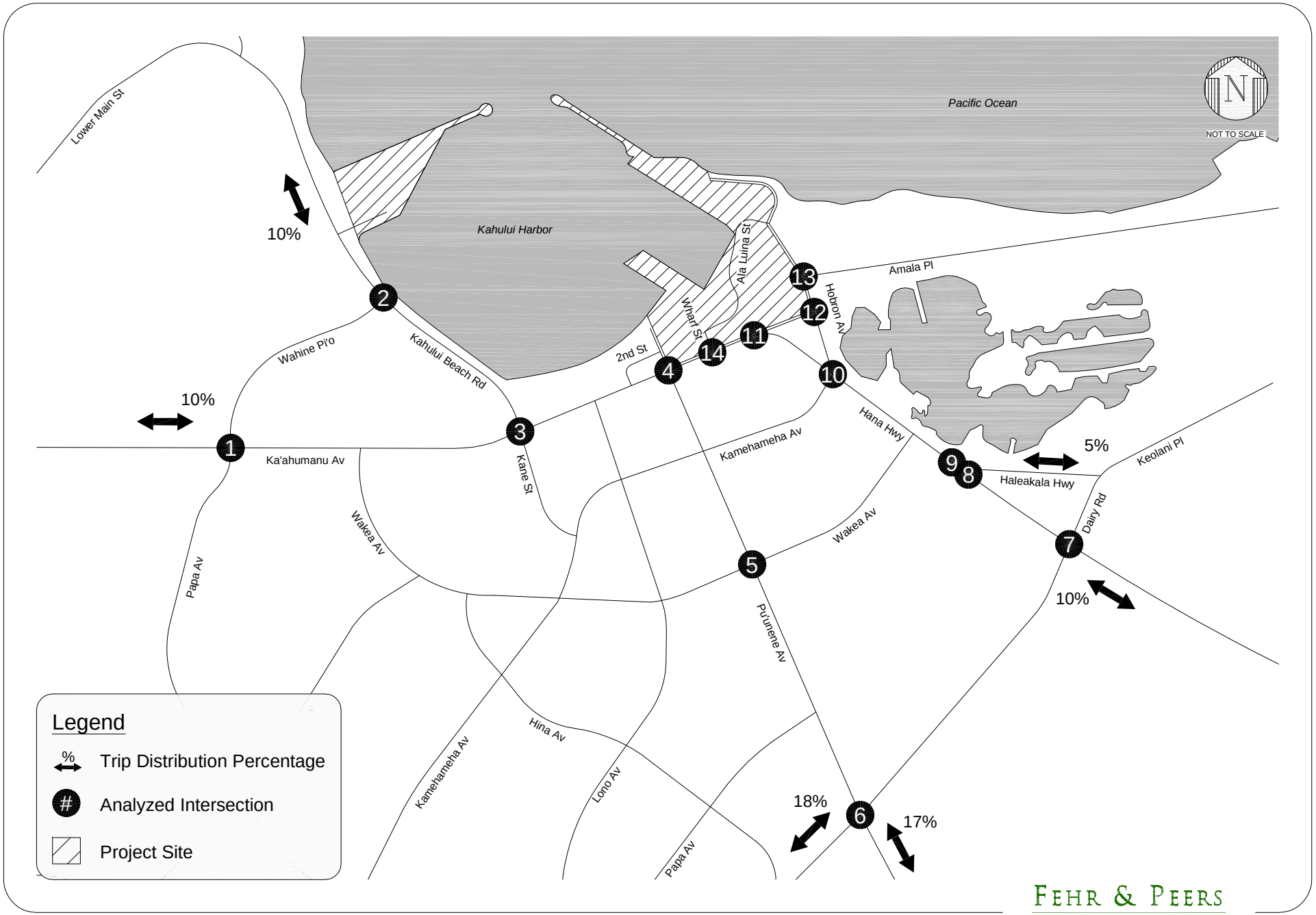

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FIGURE 8
BARGE CARGO NEW TRIP DISTRIBUTION

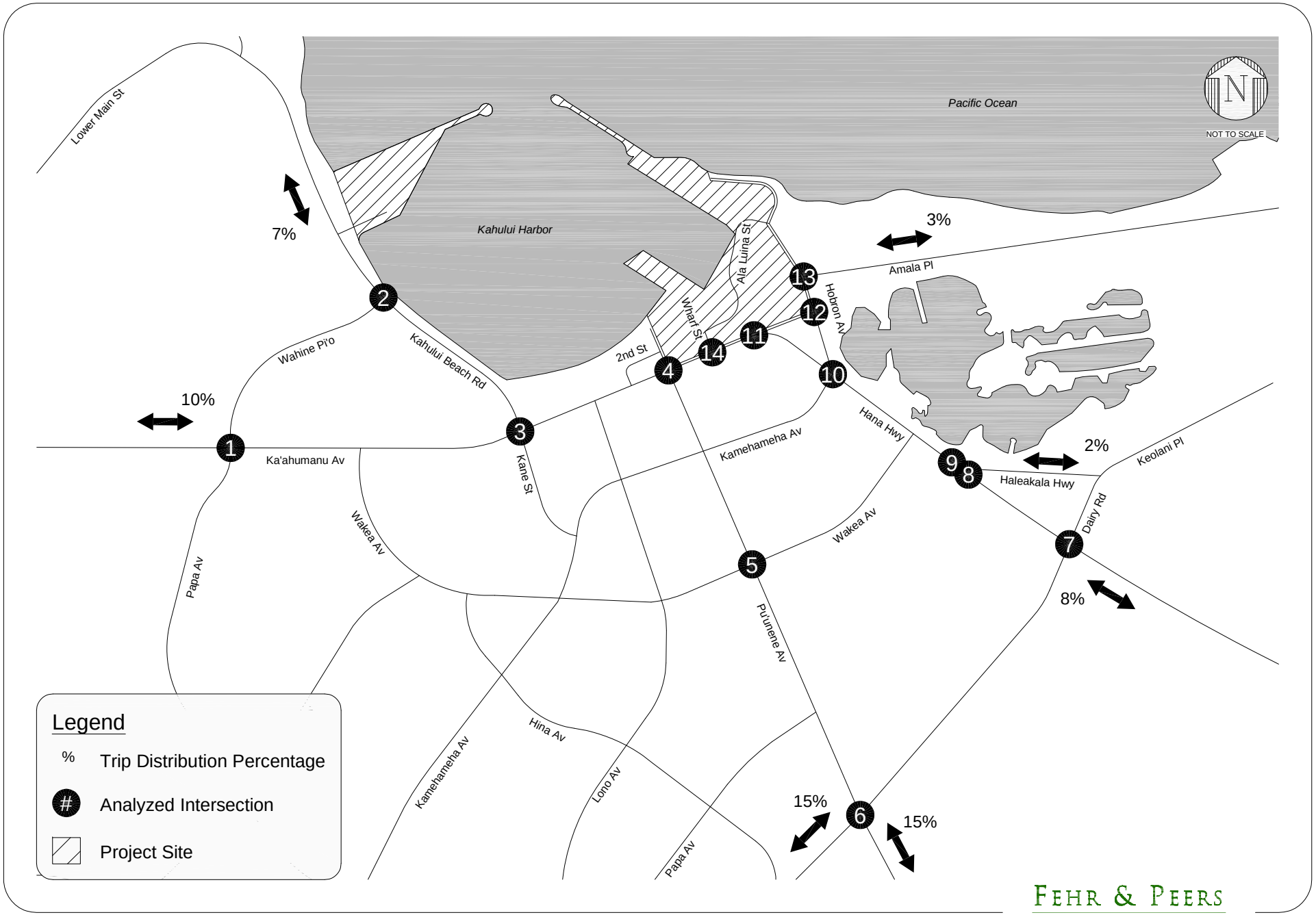

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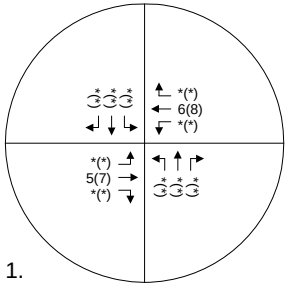
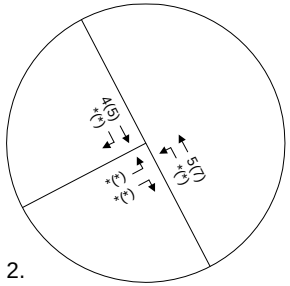
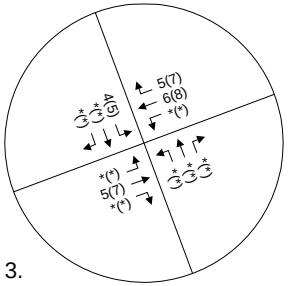
FIGURE 9
PIER 1/3 CARGO NEW TRIP DISTRIBUTION



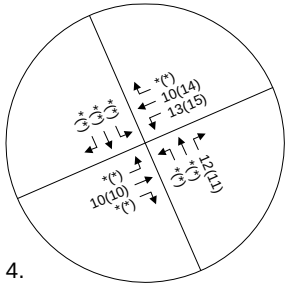
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



2. Kahului Beach Rd & Wahine Pi'o



3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



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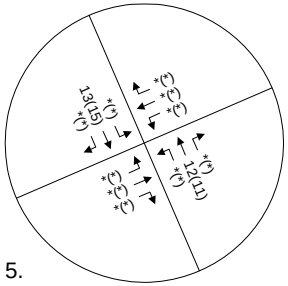

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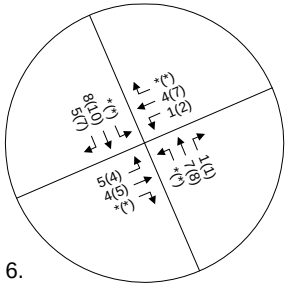

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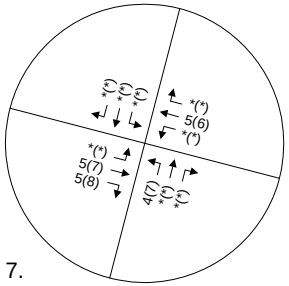

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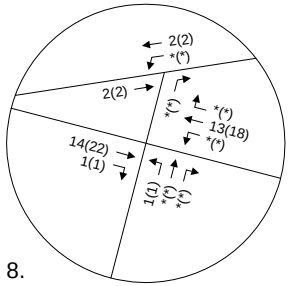

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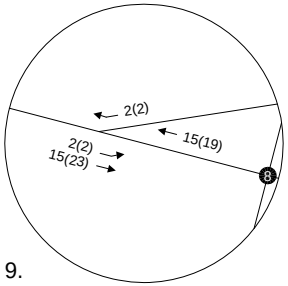

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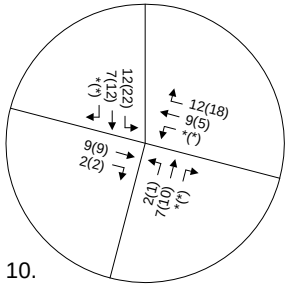

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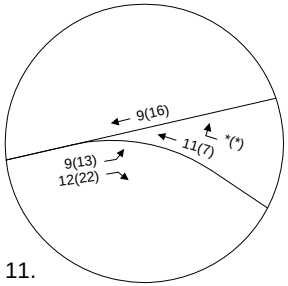
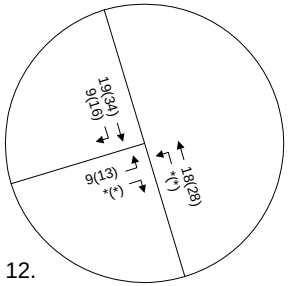


11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



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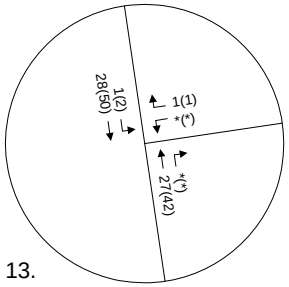
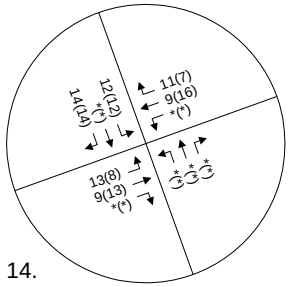


13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

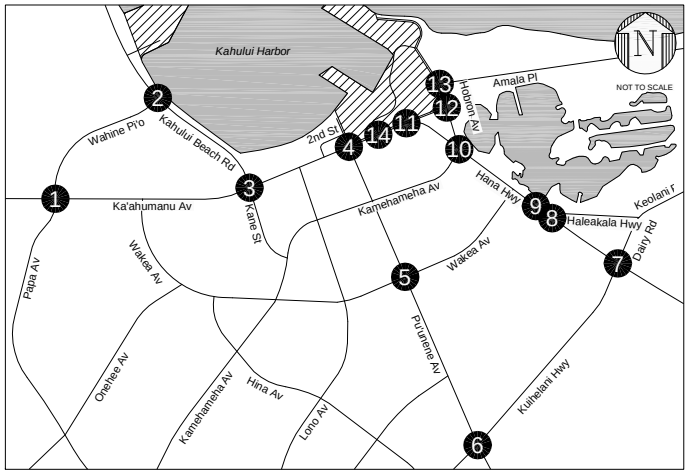


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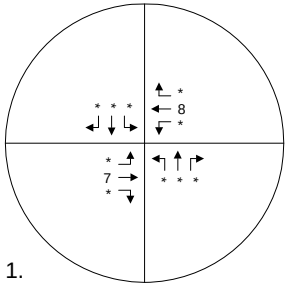
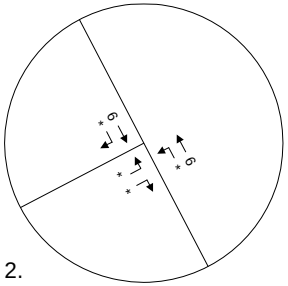
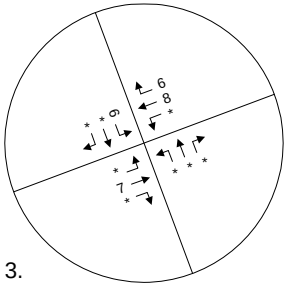
FIGURE 10A
PROJECT ALTERNATIVE A ONLY PEAK HOUR VOLUMES



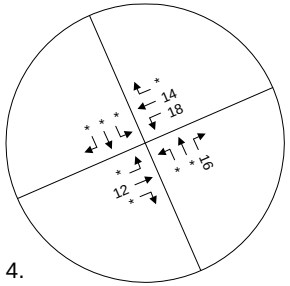
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



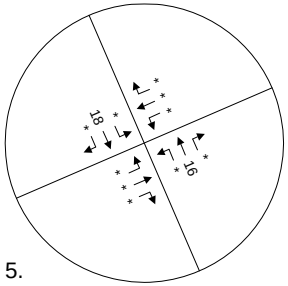
2. Kahului Beach Rd & Wahine Pi'o



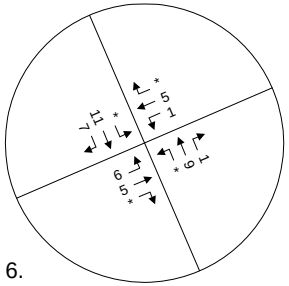
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



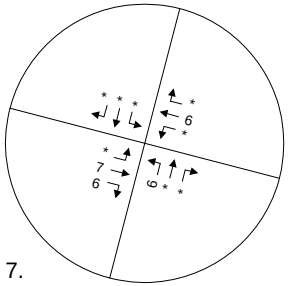
4. Pu'unene Av & Ka'ahumanu Av



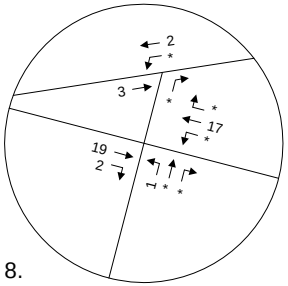
5. Pu'unene Av & Wakea Av



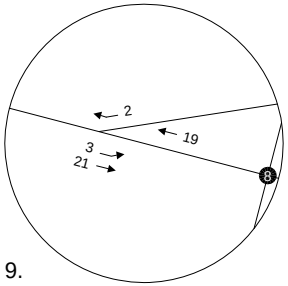
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



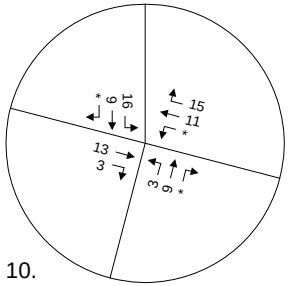
7. Dairy Rd & Hana Hwy



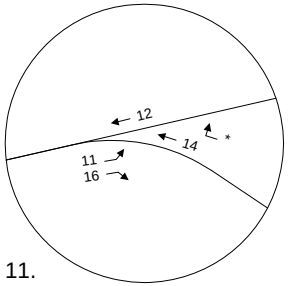
8. Haleakala Hwy/Hanakai St & Hana Hwy



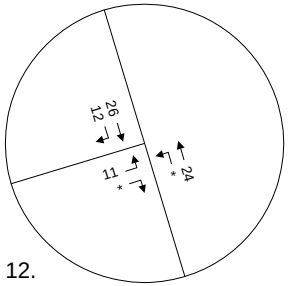
9. Haleakala Hwy/Hanakai St & Hana Hwy



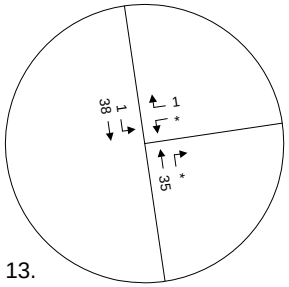
10. Hobron Av/Kamehameha Av & Hana Hwy



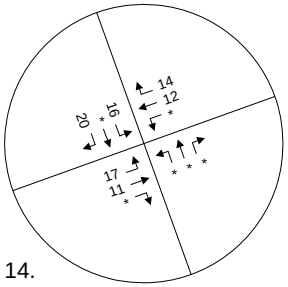
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

\# - Mid-Morning Volumes

* - Negligible Volumes

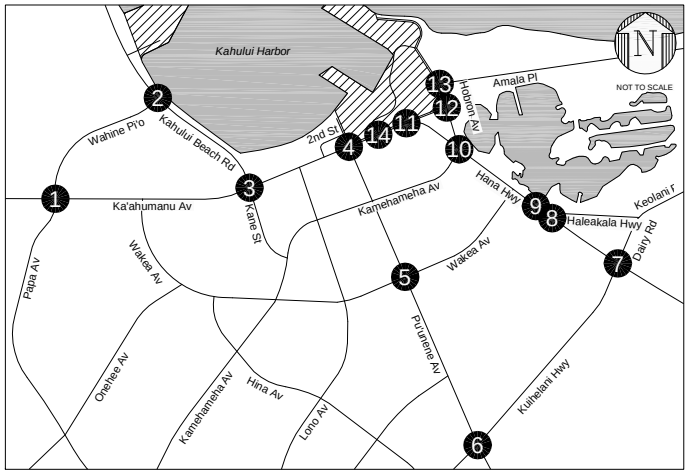


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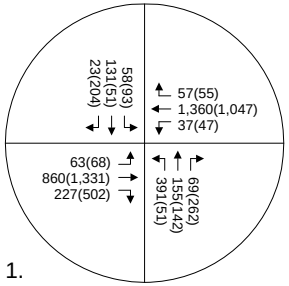
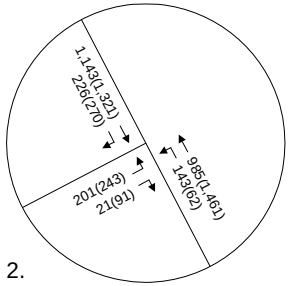
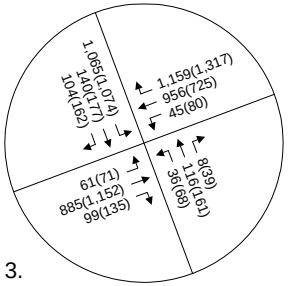
FIGURE 10B
PROJECT ALTERNATIVE A ONLY MID-MORNING PEAK HOUR VOLUMES



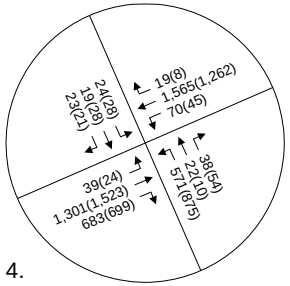
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



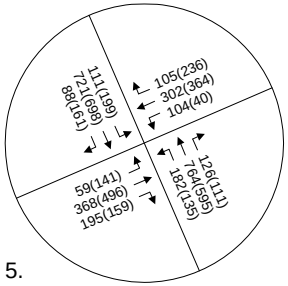
2. Kahului Beach Rd & Wahine Pi'o



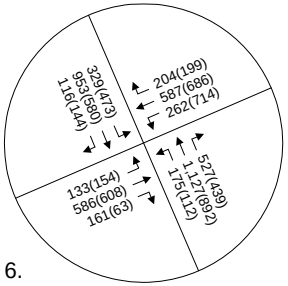
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



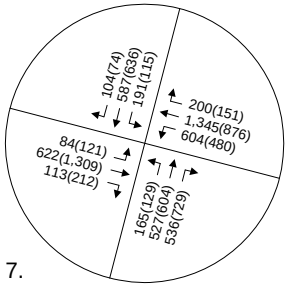
4. Pu'unene Av & Ka'ahumanu Av



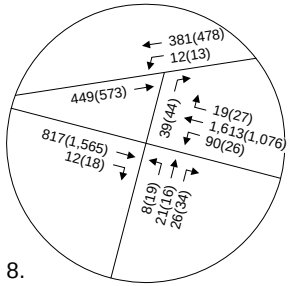
5. Pu'unene Av & Wakea Av



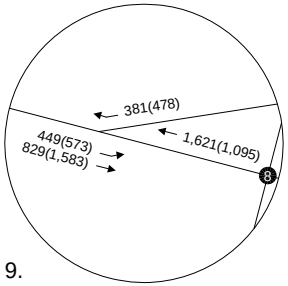
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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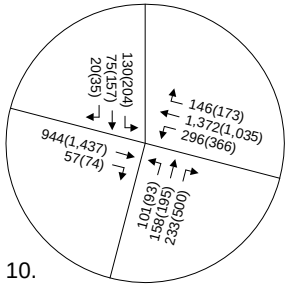
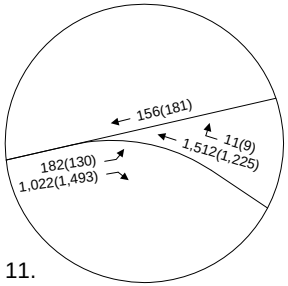
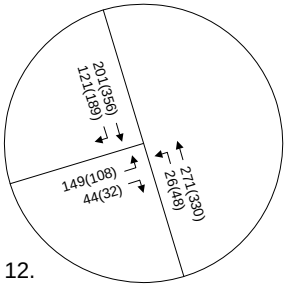


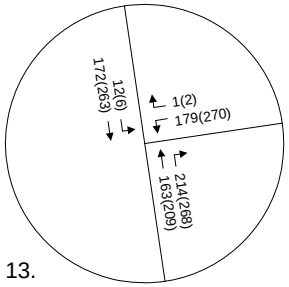
10. Hobron Av/Kamehameha Av & Hana Hwy



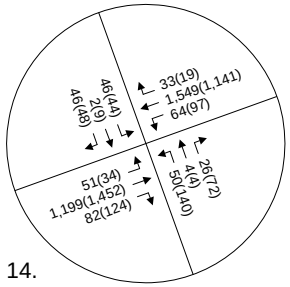
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

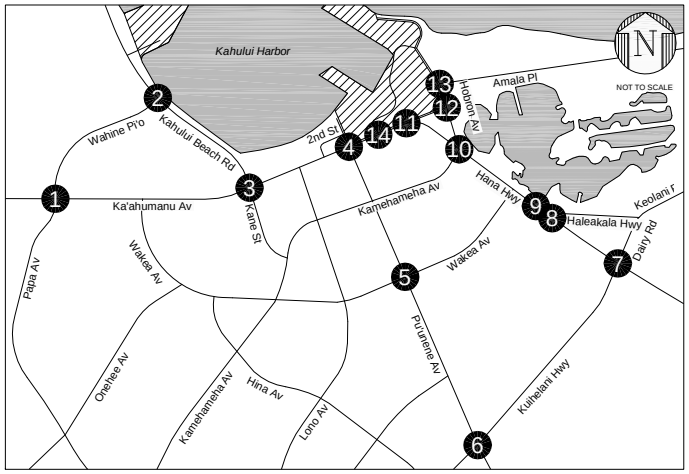


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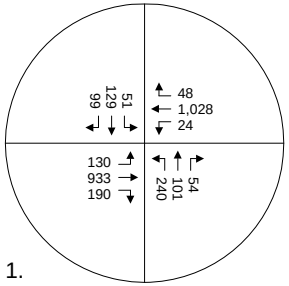
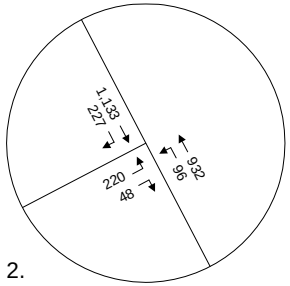
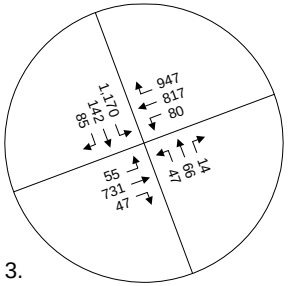
FIGURE 11A
CUMULATIVE PLUS PROJECT ALTERNATIVE A PEAK HOUR VOLUMES



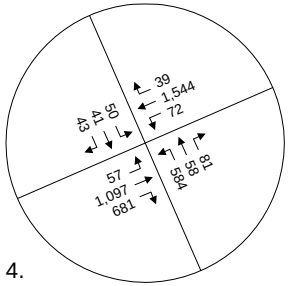
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



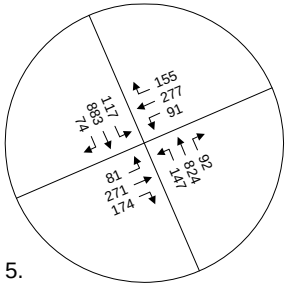
2. Kahului Beach Rd & Wahine Pi'o



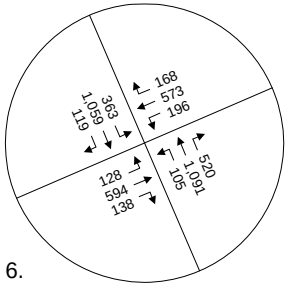
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



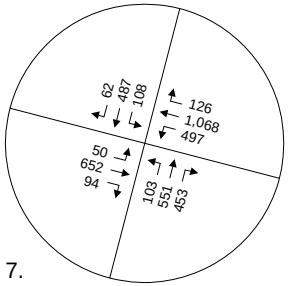
4. Pu'unene Av & Ka'ahumanu Av



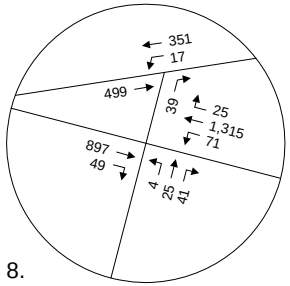
5. Pu'unene Av & Wakea Av



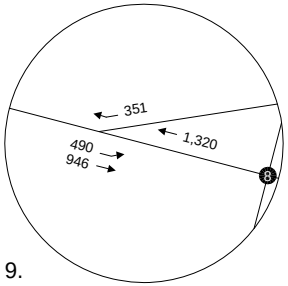
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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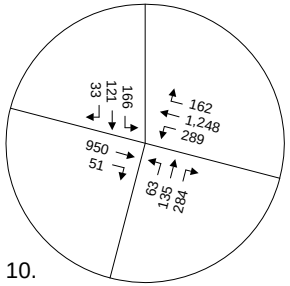
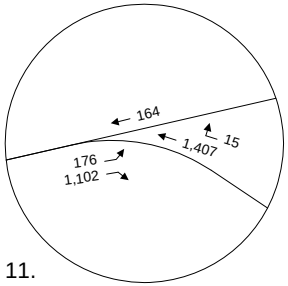
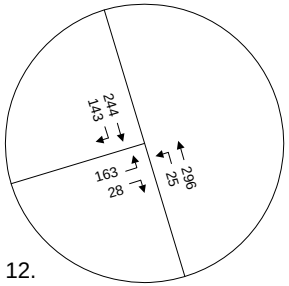


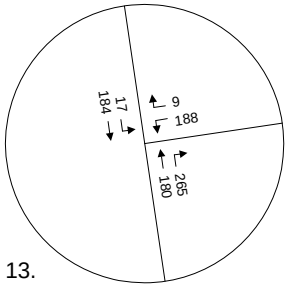
10. Hobron Av/Kamehameha Av & Hana Hwy



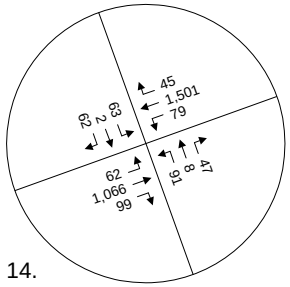
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

- Mid-Morning Volumes

* - Negligible Volumes

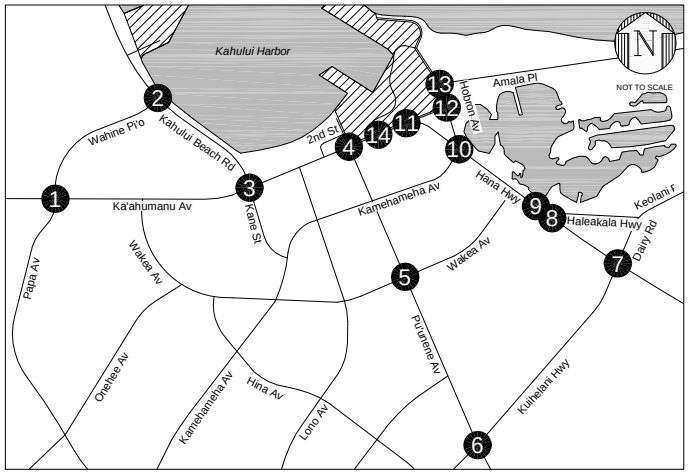


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FIGURE 11B

CUMULATIVE PLUS PROJECT ALTERNATIVE A MID-MORNING PEAK HOUR VOLUMES

IV. TRAFFIC IMPACT ANALYSIS – PREFERRED MASTER PLAN ALTERNATIVE A

This chapter presents an analysis of the potential impacts of the traffic generated by the potential implementation of the proposed project, Alternative A of the Kahului Harbor Master Plan, on the roadway system. The analysis compares the projected levels of service at each study intersection under cumulative conditions in 2030 both with and without the proposed project to determine the potential impact of the proposed project.

INTERSECTION IMPACT CRITERIA

As indicated, level of service provides a qualitative assessment of the operating conditions of a roadway facility or intersection. According to discussions with the County of Maui, the minimum acceptable LOS for any intersection in an urbanized area of Maui is LOS D. Because the entire study area is within the urbanized area of Kahului, LOS D serves as the minimum acceptable standard for this study. If under the No Action (cumulative base) scenario an intersection is operating at LOS E or F, then that location is considered to have a cumulative traffic impact.

If an intersection is operating at LOS E or F under the No Action (cumulative base) scenario and the proposed project adds delay to this intersection, then the project is considered to be contributing to a cumulative impact. If an intersection is operating at LOS D and degrades to LOS E or worse with the addition of the project traffic, then the project is considered to have a significant adverse effect at this location.

CUMULATIVE BASE (NO ACTION) TRAFFIC CONDITIONS

This section presents an analysis of potential future traffic conditions under projected year 2030 conditions. The cumulative base traffic volumes projected for the study area were analyzed using

the methodologies described in Chapter II to determine the operating conditions for existing conditions as well as base conditions for the study area.

Table 9 summarizes the results of this analysis. The following four intersections are expected to operate at LOS E or F during the a.m. or p.m. peak hours in 2030 and are considered to have a cumulative impact:

- Dairy Road & Pu'unene Avenue/Mokulele Highway
- Haleakala Highway/Hanakai Street & Hana Highway
- Haleakala Highway & Hana Highway
- Hobron Avenue & Amala Place

The remaining 10 study intersections are expected to continue operating at an acceptable level of service (LOS D or better) during both the a.m. and p.m. peak hours.

In the mid-morning peak hour, the following intersections are projected to operate at LOS E or F:

- Haleakala Highway/Hanakai Street & Hana Highway
- Haleakala Highway & Hana Highway

The remaining 12 study intersections are projected to operate at LOS D or better during the mid-morning peak hour.

The intersections listed above for the a.m., mid-morning and p.m. peak hours remain at unacceptable levels of service independent of any port planning activity. These locations are operating at these LOS values because of the ambient traffic growth predicted by 2030.

CUMULATIVE PLUS PROJECT (ALTERNATIVE A) TRAFFIC CONDITIONS

The cumulative plus project peak hour traffic volumes illustrated in Figures 10A and 10B were analyzed to determine 2030 operating conditions with the addition of project-related traffic. The

TABLE 9
YEAR 2030 - CUMULATIVE BASE (NO ACTION) CONDITIONS
PEAK HOUR LEVELS OF SERVICE

Intersections	Control	Peak Hour	2007 Baseline		2030 Cumulative Base No Action		Del/Veh Change	Cumulative Impact?
			Del/Veh[1]	LOS	Del/Veh[1]	LOS		
1. Ka'ahumanu Av & Papa Av/Wahine Pi'o	Signalized	A.M.	23.8	C	27.6	C	4	NO
		Mid-A.M.	18.6	B	19.7	B	1	NO
		P.M.	18.8	B	22.3	C	4	NO
2. Wahine Pi'o & Kahului Beach Rd	Signalized	A.M.	10.7	B	12.1	B	1	NO
		Mid-A.M.	8.7	A	9.0	A	0	NO
		P.M.	10.7	B	11.5	B	1	NO
3. Ka'ahumanu Av & Kahului Beach Rd / Kane St	Signalized	A.M.	22.8	C	30.3	C	8	NO
		Mid-A.M.	22.1	C	27.2	C	5	NO
		P.M.	39.6	D	42.4	D	3	NO
4. Ka'ahumanu Av & Pu'unene Av	Signalized	A.M.	19.3	B	22.1	C	3	NO
		Mid-A.M.	42.3	D	54.7	D	12	NO
		P.M.	29.5	C	38.4	D	9	NO
5. Wakea Av & Pu'unene Av	Signalized	A.M.	27.0	C	29.3	C	2	NO
		Mid-A.M.	25.3	C	27.9	C	3	NO
		P.M.	29.3	C	31.4	C	2	NO
6. Dairy Rd & Pu'unene Av / Mokulele Hwy	Signalized	A.M.	32.9	C	45.1	D	12	NO
		Mid-A.M.	30.8	C	40.2	D	9	NO
		P.M.	55.7	E	85.7	F	30	YES
7. Dairy Rd & Hana Hwy	Signalized	A.M.	29.6	C	33.4	C	4	NO
		Mid-A.M.	23.8	C	26.2	C	2	NO
		P.M.	33.7	C	40.4	D	7	NO
8. Haleakala Hwy / Hanakai St & Hana Hwy	Side-Street Stop	A.M.	41.0	E	50.0	E	9	YES
		Mid-A.M.	31.0	D	35.9	E	5	YES
		P.M.	32.0	D	39.2	E	7	YES
9. Haleakala Hwy & Hana Hwy	Side-Street Stop	A.M.	37.0	E	119.5	F	83	YES
		Mid-A.M.	11.0	B	54.5	F	44	YES
		P.M.	7.0	A	48.7	E	42	YES
10. Hobron Av / Kamehameha Av & Hana Hwy	Signalized	A.M.	22.4	C	24.9	C	3	NO
		Mid-A.M.	22.1	C	23.7	C	2	NO
		P.M.	37.9	D	54.7	D	17	NO
11. Ka'ahumanu Av / Hana Hwy & Ka'ahumanu Av	Side-Street Stop	A.M.	12.0	B	26.5	D	15	NO
		Mid-A.M.	13.0	B	21.9	C	9	NO
		P.M.	14.0	B	14.2	B	0	NO
12. Hobron Av & Ka'ahumanu Av	Side-Street Stop	A.M.	15.0	B	19.3	C	4	NO
		Mid-A.M.	18.0	C	19.9	C	2	NO
		P.M.	26.0	D	30.3	D	4	NO
13. Hobron Av & Amala Pl	Side-Street Stop	A.M.	20.0	C	24.3	C	4	NO
		Mid-A.M.	24.0	C	31.6	D	8	NO
		P.M.	46.0	E	81.0	F	35	YES
14. Ka'ahumanu Av & Wharf St	Signalized	A.M.	6.7	A	7.7	A	1	NO
		Mid-A.M.	9.4	A	10.1	B	1	NO
		P.M.	11.4	B	12.7	B	1	NO

Note:
1 Delay indicates average stopped delay per vehicle in seconds for signalized intersections.
For stop-controlled intersections delay is shown for the worst-case intersection approach.

results of the cumulative plus project analysis are presented in Table 10. The proposed project would contribute to cumulatively impacted conditions (LOS E of F) during one or both of the a.m. or p.m. peak hours at three study intersections:

- Dairy Road & Pu'unene Avenue/Mokulele Highway
- Haleakala Highway/Hanakai Street & Hana Highway
- Haleakala Highway & Hana Highway

All intersections, with the exception of Haleakala Highway/Hanakai Street and Hana Highway in the a.m. peak hour and Haleakala Highway and Hana Highway in the p.m. peak hour, will remain at the same LOS as in the cumulative base scenario. Both of these intersections worsen from a LOS E to F, with changes in delay between one and eight seconds. The intersection of Hobron Avenue and Amala Place will still operate at LOS F under with project conditions, but will operate with less delay with the project than in the No Action scenario. This is as a direct result of the relocation of cruise ship operations to the West Breakwater.

In 2030 during the mid-morning peak hour (with the addition of the Master Plan), the intersection of Haleakala Highway/Hanakai Street and Hana Highway remains at LOS E with a minimal increase in delay. Additionally, the intersection of Haleakala Highway and Hana Highway stays at LOS F. Improvements in delay and LOS occur at the intersection of Ka'ahumanu Avenue and Pu'unene Avenue in the mid-morning peak hour. This is a direct result of the relocation of ferry operations to the West Breakwater.

PROPOSED MITIGATION MEASURES AND PROJECT CONTRIBUTION

The mitigation program for the project developed measures to increase the capacity and/or efficiency of the roadway system at locations where the addition of project-related traffic would contribute to projected poor operating conditions. The primary emphasis was to identify physical and/or operational improvements that could be implemented within the existing or planned roadway rights-of-way.

TABLE 10
YEAR 2030 CUMULATIVE BASE PLUS PROJECT ALTERNATIVE A CONDITIONS
PEAK HOUR LEVELS OF SERVICE

Intersections	Control	Peak Hour	2030 Cumulative Base No Action		2030 Cumulative plus Project Alt A		Del/Veh Change	Cumulative Impact?	Significant Adverse Effect?	2030 + Project Alt A with Mitigation		Cumulative Impact?
			Del/Veh[1]	LOS	Del/Veh[1]	LOS				Del/Veh[1]	LOS	
1. Ka'ahumanu Av & Papa Av/Wahine Pi'o	Signalized	A.M.	27.6	C	28.7	C	1.1	NO	NO			
		Mid-A.M.	19.7	B	26.5	C	6.8	NO	NO			
		P.M.	22.3	C	22.6	C	0.3	NO	NO			
2. Wahine Pi'o & Kahului Beach Rd	Signalized	A.M.	12.1	B	12.3	B	0.2	NO	NO			
		Mid-A.M.	9.0	A	12.6	B	3.6	NO	NO			
		P.M.	11.5	B	11.8	B	0.3	NO	NO			
3. Ka'ahumanu Av & Kahului Beach Rd / Kane St	Signalized	A.M.	30.3	C	30.8	C	0.5	NO	NO			
		Mid-A.M.	27.2	C	29.3	C	2.1	NO	NO			
		P.M.	42.4	D	44.5	D	2.1	NO	NO			
4. Ka'ahumanu Av & Pu'unene Av	Signalized	A.M.	22.1	C	23.3	C	1.2	NO	NO			
		Mid-A.M.	54.7	D	33.5	C	-21.2	NO	NO			
		P.M.	38.4	D	40.5	D	2.1	NO	NO			
5. Wakea Av & Pu'unene Av	Signalized	A.M.	29.3	C	29.6	C	0.3	NO	NO			
		Mid-A.M.	27.9	C	27.9	C	0.0	NO	NO			
		P.M.	31.4	C	31.7	C	0.3	NO	NO			
6. Dairy Rd & Pu'unene Av / Mokulele Hwy	Signalized	A.M.	45.1	D	46.0	D	0.9	NO	NO	36.5	D	NO
		Mid-A.M.	40.2	D	41.3	D	1.1	NO	NO	32.1	C	NO
		P.M.	85.7	F	87.2	F	1.5	YES	NO	53.3	D	NO
7. Dairy Rd & Hana Hwy	Signalized	A.M.	33.4	C	33.5	C	0.1	NO	NO			
		Mid-A.M.	26.2	C	26.3	C	0.1	NO	NO			
		P.M.	40.4	D	41.3	D	0.9	NO	NO			
8. Haleakala Hwy / Hanakai St & Hana Hwy	Side-Street Stop (Signalized)	A.M.	50.0	E	51.0	F	1.0	YES	NO	24.7	C	NO
		Mid-A.M.	35.9	E	36.9	E	1.0	YES	NO	20.7	C	NO
		P.M.	39.2	E	42.6	E	3.4	YES	NO	16.1	B	NO
9. Haleakala Hwy & Hana Hwy	Side-Street Stop	A.M.	119.5	F	127.7	F	8.2	YES	NO	Intersections 8 & 9 combined, in mitigation, as a single signalized intersection 8 (see above)		
		Mid-A.M.	54.5	F	59.7	F	5.2	YES	NO			
		P.M.	48.7	E	53.2	F	4.5	YES	NO			
10. Hobron Av / Kamehameha Av & Hana Hwy	Signalized	A.M.	24.9	C	25.3	C	0.4	NO	NO			
		Mid-A.M.	23.7	C	24.2	C	0.5	NO	NO			
		P.M.	54.7	D	53.4	D	-1.3	NO	NO			
11. Ka'ahumanu Av / Hana Hwy & Ka'ahumanu Av	Side-Street Stop	A.M.	26.5	D	27.8	D	1.3	NO	NO			
		Mid-A.M.	21.9	C	23.4	C	1.5	NO	NO			
		P.M.	14.2	B	14.9	B	0.7	NO	NO			
12. Hobron Av & Ka'ahumanu Av	Side-Street Stop	A.M.	19.3	C	18.4	C	-0.9	NO	NO			
		Mid-A.M.	19.9	C	19.9	C	0.0	NO	NO			
		P.M.	30.3	D	34.3	D	4.0	NO	NO			
13. Hobron Av & Amala Pl	Side-Street Stop	A.M.	24.3	C	21.4	C	-2.9	NO	NO			
		Mid-A.M.	31.6	D	28.5	D	-3.1	NO	NO			
		P.M.	81.0	F	64.3	F	-16.7	YES	NO			
14. Ka'ahumanu Av & Wharf St	Signalized	A.M.	7.7	A	8.2	A	0.5	NO	NO			
		Mid-A.M.	10.1	B	10.4	B	0.3	NO	NO			
		P.M.	12.7	B	14.3	B	1.6	NO	NO			

Note:
1 Delay indicates average stopped delay per vehicle in seconds for signalized intersections.
For stop-controlled intersections delay is shown for the worst-case intersection approach.

The project-related component of future traffic growth at the intersections with cumulative impacts was calculated based on the proportion of project peak hour traffic relative to the total new peak hour 2030 traffic volumes. Fair-share calculations were made for the a.m., mid-morning and p.m. peak hours, and the maximum project contribution was estimated to be between approximately 5% and 14%, as shown in Table 11. The recommended mitigations measures to address the identified cumulative traffic impacts are described below:

- Dairy Road and Pu'unene Avenue/Mokulele Highway – The intersection of Dairy Road and Pu'unene Avenue/Mokulele Highway could be mitigated to LOS D with the addition of another southbound left-turn lane. The high volumes of left turns during the p.m. peak hour are delayed by the increases in through traffic at this location. In order to accommodate another southbound left-turn lane on Pu'unene Avenue, this mitigation requires the removal of a 15-foot landscaped median at this intersection. With the new configuration at this intersection, the LOS would improve over the 2030 No Action scenario. While this improvement mitigates the impact of the Harbor traffic, there is the need to consider regionally-oriented long-term improvements to accommodate anticipated regional traffic growth from West and South Maui. The project's fair-share contribution to the cost of this mitigation measure is identified as 4.3%.

- Haleakala Highway/Hanakai Street and Hana Highway and Haleakala Highway and Hana Highway – These two stop-controlled intersections are operating poorly under the cumulative base (No Action) scenario and will worsen very slightly with the addition of the proposed project. In order to improve operations at this intersection, the two intersections should be combined into one and signalized. Signal warrant analysis was conducted based on the Peak Hour Warrant presented in *Manual on Uniform Traffic Control Devices* (MUTCD) (National Committee on Uniform Traffic Control Devices, 2003). It indicates that a traffic signal installation at this location would be warranted under cumulative plus project conditions. The proposed combined operation will pull the left-turn pocket for eastbound traffic on Hana Highway up to the intersection at Hanakai Street, allowing this movement protected turn status. The lane configuration for this mitigation is shown in Appendix A. With installation of the signal and the combination of the two intersections, the intersection would operate no worse than LOS C for any of the analyzed peak hours. The project's fair-share contribution to the cost of this mitigation measure is identified as 13.9%.

EFFECTIVENESS OF MITIGATION MEASURES

The effectiveness of each of the proposed mitigation measures was assessed using the same techniques used to assess project operating conditions. As illustrated in Table 10, the effect of the project contribution on the cumulative traffic impacts would be fully mitigated with the implementation of the proposed mitigation measures. The results indicate that each of these

TABLE 11
PROJECT ALTERNATIVE A FAIR SHARE INTERSECTION TRAFFIC CONTRIBUTION

Intersection	Peak Hour	Existing Traffic	2030 With Project Traffic	Project Traffic	Total New Traffic	Project % of new Traffic
Pu'unene Av/Mokulele Hwy & Dairy Road	A.M.	4076	5160	35	1084	3.2%
	MID-A.M.	3989	5054	45	1065	4.2%
	P.M.	4328	5064	44	736	6.0%
	Average	**4131**	**5093**	**41**	**962**	**4.3%**
Haleakala Hwy/Hanakai St & Hana Hwy	A.M.	2358	2606	29	248	11.7%
	MID-A.M.	2215	2427	39	212	18.4%
	P.M.	2509	2781	42	271	15.5%
	Average	**2361**	**2605**	**37**	**244**	**15.2%**
Haleakala Hwy & Hana Hwy	A.M.	1880	2070	17	190	8.9%
	MID-A.M.	1647	1810	22	163	13.5%
	P.M.	1508	1668	21	160	13.1%
	Average	**1678**	**1849**	**20**	**171**	**11.7%**
Haleakala Hwy/Hanakai St & Hana Hwy & Haleakala Hwy & Hana Hwy						
	Combined Fair Share					**13.9%**

intersections would operate at LOS D or better under future conditions with the addition of the proposed project traffic and the recommended mitigation measure.

REGIONAL ANALYSIS

An analysis was conducted to determine the potential impacts to Maui's roadway system on a regional basis. Given the future year analysis of the project is 2030, assessment of the impact of the proposed Master Plan on the key regional highways was essential to determine whether any additional mitigation was required. The following segments were examined with the proposed project, and the increase in traffic at each location was identified:

- Ka'ahumanu Avenue east of Kahului Beach Road
- Hana Highway west of Haleakala Highway
- Pu'unene Avenue south of Ka'ahumanu Avenue

The increases in traffic attributable to the proposed Master Plan (Alternative A) are displayed in Table 12. The largest two-way increase in traffic occurs on the Hana Highway segment (in the p.m. peak hour), where traffic grows by approximately 46 trips (or 1.3%). The largest percentage increase in traffic occurs on the Pu'unene Avenue segment (in the mid-morning peak hour) where traffic grows by 2.2% (or 34 trips).

Based on the 2030 cumulative base (No Action) volumes, the estimated level of increase in traffic on the aforementioned segments is not deemed to be significant. The project, on the whole, is responsible for marginal increases in traffic on the regional street system in Maui.

TABLE 12
REGIONAL TRAFFIC GROWTH ANALYSIS

Street	Location	Direction	Cumulative Base			New Trips - Alternative A			% Increase in New Trips		
			A.M.	MID-A.M.	P.M.	A.M.	MID-A.M.	P.M.	A.M.	MID-A.M.	P.M.
Ka'ahumanu Av	East of Kahului Beach Rd	WB	2127	1825	2088	11	14	15	0.5%	0.8%	0.7%
		EB	1936	1838	2229	9	13	12	0.5%	0.7%	0.5%
		total	**4063**	**3663**	**4317**	**20**	**27**	**27**	**0.5%**	**0.7%**	**0.6%**
Hana Hwy	West of Haleakala Hwy	WB	1985	1650	1522	17	21	21	0.9%	1.3%	1.4%
		EB	1261	1412	2131	17	24	25	1.3%	1.7%	1.2%
		total	**3246**	**3062**	**3653**	**34**	**45**	**46**	**1.0%**	**1.5%**	**1.3%**
Pu'unene Av	South of Ka'ahumanu Av	SB	758	814	757	13	18	15	1.7%	2.2%	2.0%
		NB	619	707	927	12	16	11	1.9%	2.3%	1.2%
		total	**1377**	**1521**	**1684**	**25**	**34**	**26**	**1.8%**	**2.2%**	**1.5%**

V. MASTER PLAN ALTERNATIVE B ANALYSIS

As discussed, the alternative to the project is also evaluated in this report and is referred to as Alternative B. This project alternative also includes the development of Piers 4 and the West Breakwater and Pier 5. In this scenario, Pier 5 would be used primarily for cargo operations. Pier 5 would be 1,200 feet long with 26 acres for the cargo operations. Pier 2 would be redeveloped to accommodate both the ferry and cruise ships. As part of this redevelopment, Pier 2 would be increased in length to 1,200 feet with 6.2 acres available for cruise ship operations. The area dedicated to ferry operations would consist of 4.4 acres with 10.6 acres for cargo operations. The full project description for Alternative B is shown in Figure 3.

MASTER PLAN ALTERNATIVE B TRAFFIC PROJECTIONS

Alternative B proposes the use of Pier 5, configured for barge cargo operation. Compared to Alternative A, barge cargo would have similar berth length available, but with less storage area. This option would alter Pier 2 for continued use of the ferry, and would subsequently add cruise ship operations in the same location. This option does not expand Pier 1 or 3, but Pier 1/3 cargo operations will be relieved of current cruise ship berth and storage space.

Alternative B Trip Generation

Techniques similar to those used for the trip generation for the preferred alternative were used to develop trip generation estimates for the Master Plan Alternative B. Table 13 summarizes the additional vehicle trips generated by the proposed port expansion configuration by Year 2030.

TABLE 13
MASTER PLAN ALTERNATIVE B TRIP GENERATION
(INCREMENTAL INCREASE IN TRIPS IN YEAR 2030)

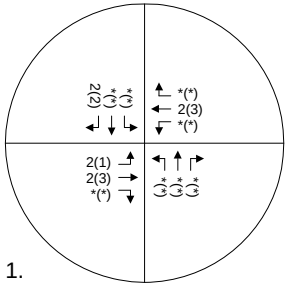
Operation	A.M. Peak Hour			Mid-A.M. Peak Hour			P.M. Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
Barge Cargo	18	20	38	23	27	50	11	20	31
Piers 1/3 Cargo	17	18	35	21	23	44	26	31	57
Cruise Related	0	0	0	0	0	0	0	0	0
Ferry	0	0	0	0	0	0	0	0	0
TOTAL	35	38	73	44	50	94	37	51	88

Project Trip Distribution and Trip Assignment

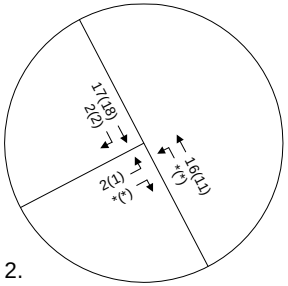
The trip distribution patterns developed for Alternative A and illustrated in Figures 8 and 9 were also used to develop a distribution pattern for trips generated by Alternative B. Figure 12A illustrates the assignment of project traffic for Alternative B to each of the 14 study intersections during the morning and evening peak hour, while Figure 12B illustrates the assignment of project-related traffic at each study intersection for Alternative B during the mid-morning peak hour.

INTERSECTION IMPACT CRITERIA

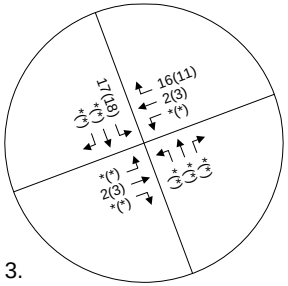
As indicated, level of service provides a qualitative assessment of the operating condition of a roadway facility or intersection. According to discussions with the County of Maui, the minimum acceptable level of service for any intersection in an urbanized area of Maui is LOS D. Because the entire study area is within the urbanized area of Kahului, LOS D serves as the minimum acceptable standard for this study. If under the No Action (cumulative base) scenario an



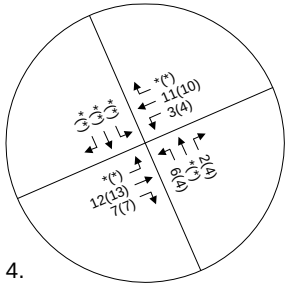
1.
Papa Av/Wahine Pi'o &
Ka'ahumanu Av



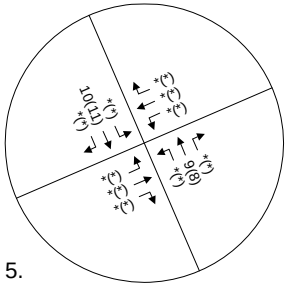
2.
Kahului Beach Rd &
Wahine Pi'o



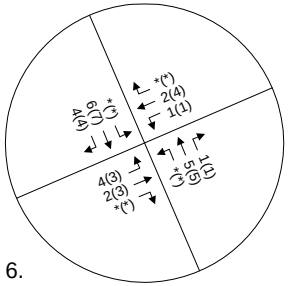
3.
Kahului Beach Rd/Kane St &
Ka'ahumanu Av



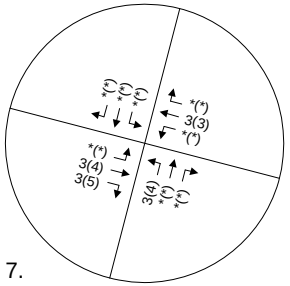
4.
Pu'unene Av &
Ka'ahumanu Av



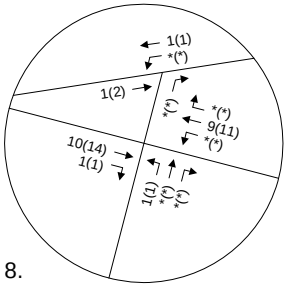
5.
Pu'unene Av &
Wakea Av



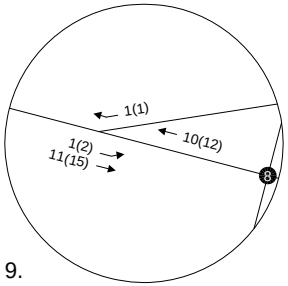
6.
Pu'unene Av/Mokulele Hwy &
Dairy Rd



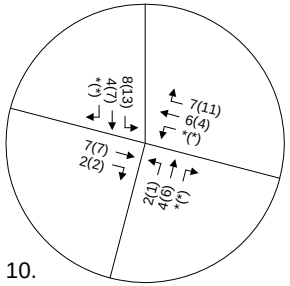
7.
Dairy Rd &
Hana Hwy



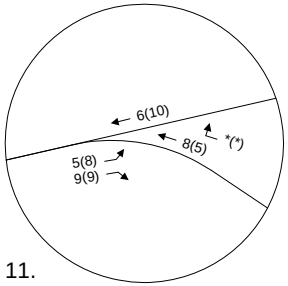
8.



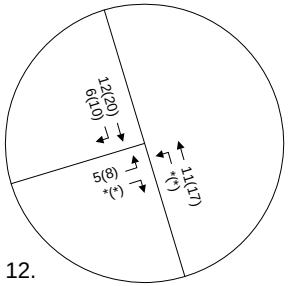
9.
Haleakala Hwy/Hanakai St &
Hana Hwy



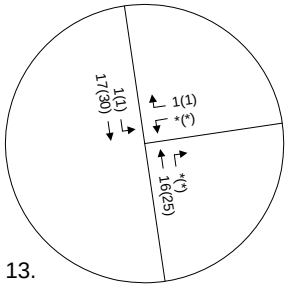
10.
Hobron Av/Kamehameha Av &
Hana Hwy



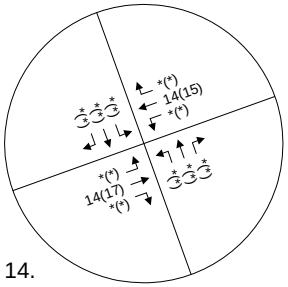
11.
Ka'ahumanu Av &
Ka'ahumanu Av/Hana Hwy



12.
Hobron Av &
Ka'ahumanu Av



13.
Hobron Av &
Amala Pl

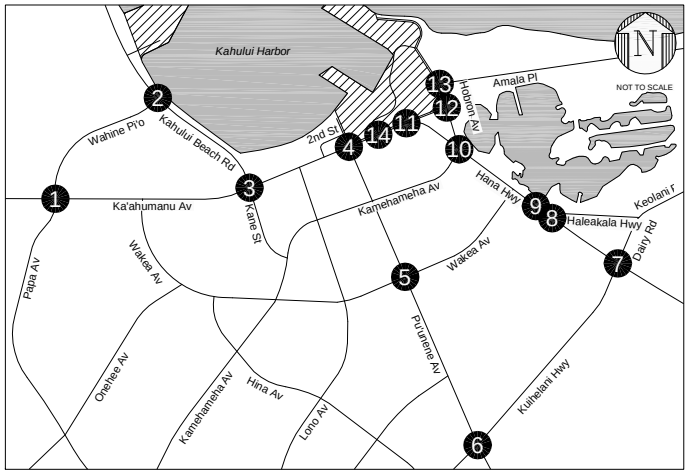


14.
Wharf St &
Ka'ahumanu Av

Legend

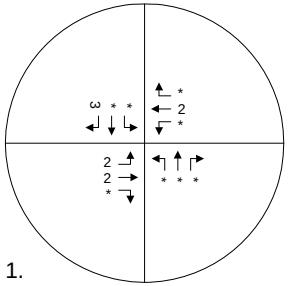
#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

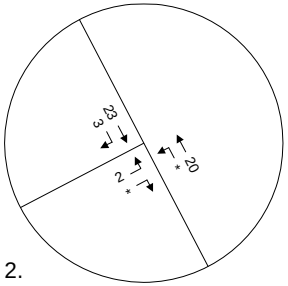


FEHR & PEERS
KAKU ASSOCIATES

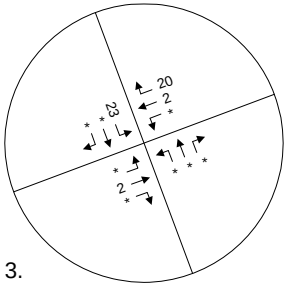
FIGURE 12A
PROJECT ALTERNATIVE B ONLY PEAK HOUR VOLUMES



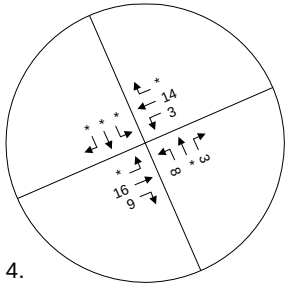
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



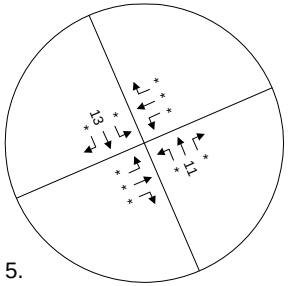
2. Kahului Beach Rd & Wahine Pi'o



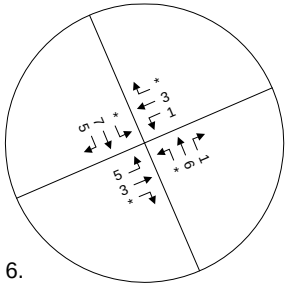
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



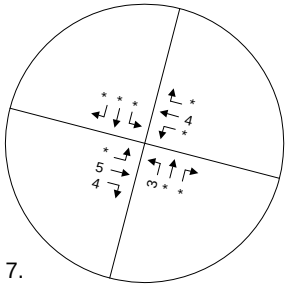
4. Pu'unene Av & Ka'ahumanu Av



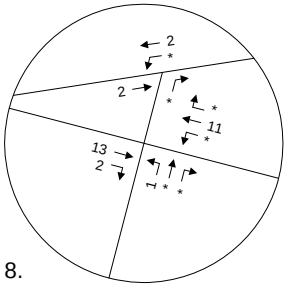
5. Pu'unene Av & Wakea Av



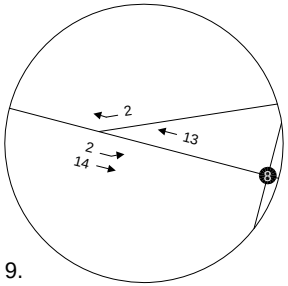
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



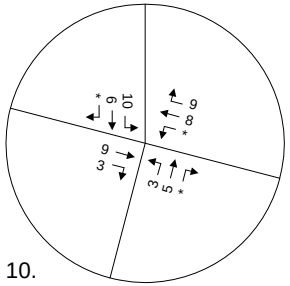
7. Dairy Rd & Hana Hwy



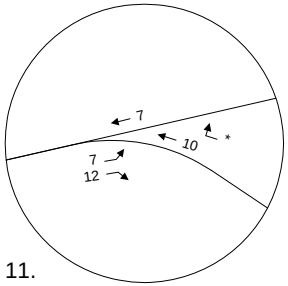
8. Haleakala Hwy/Hanakai St & Hana Hwy



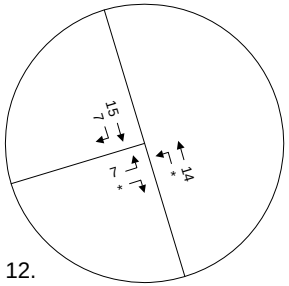
9. Haleakala Hwy/Hanakai St & Hana Hwy



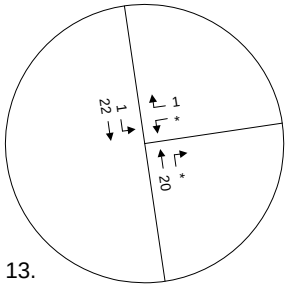
10. Hobron Av/Kamehameha Av & Hana Hwy



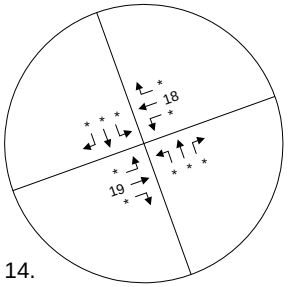
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

- Mid-Morning Volumes

* - Negligible Volumes

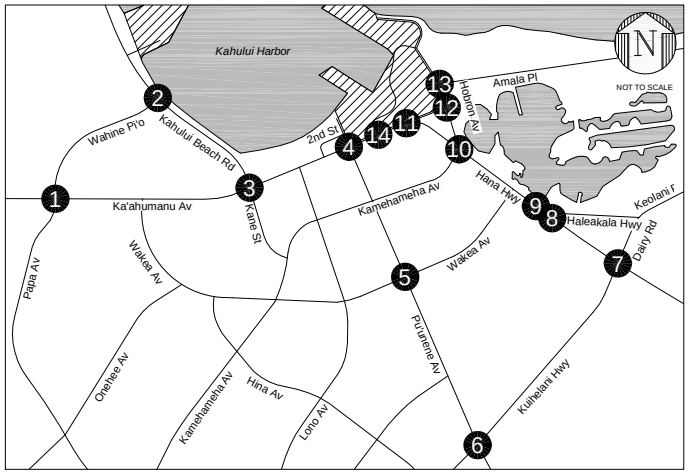


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FIGURE 12B

PROJECT ALTERNATIVE B ONLY MID-MORNING PEAK HOUR VOLUMES

intersection is operating at LOS E or F, then that location is considered to have a cumulative traffic impact.

If an intersection is operating at LOS E or F under the No Action (cumulative base) scenario and the proposed project adds delay to this intersection, then the project is considered to be contributing to a cumulative impact. If an intersection is operating at LOS D and degrades to LOS E or worse with the addition of the project traffic, then the project is considered to have a significant adverse effect.

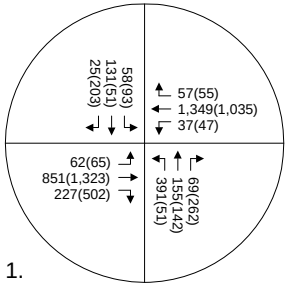
CUMULATIVE PLUS PROJECT TRAFFIC PROJECTIONS

The cumulative plus project traffic projections for Alternative B were developed using the same techniques and the same data base as for the preferred alternative, the proposed Master Plan. The cumulative base traffic volumes illustrated in Figures 7A and 7B were used along with the project volumes illustrated in Figures 12A and 12B for Alternative B to develop the cumulative plus project traffic forecasts for master plan Alternative B. Figure 13A illustrates the projected volumes for each of the 14 study intersections during the morning and afternoon peak hours and Figure 13B illustrates the forecasts for the mid-morning peak hour.

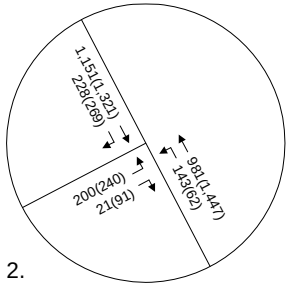
ANALYSIS OF CUMULATIVE PLUS PROJECT (ALTERNATIVE B) TRAFFIC CONDITIONS

The cumulative plus project peak hour traffic volumes illustrated in Figures 13A and 13B were analyzed to determine 2030 operating conditions with the addition of project-related traffic for Alternative B. The results of the cumulative plus project analysis for Alternative B are presented in Table 14. The proposed project would contribute to cumulative impacts (LOS E or F conditions) during one or both peak hours at three study intersections:

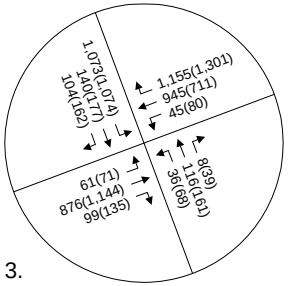
- Dairy Road & Pu'unene Avenue/Mokulele Highway
- Haleakala Highway/Hanakai Street & Hana Highway
- Haleakala Highway & Hana Highway



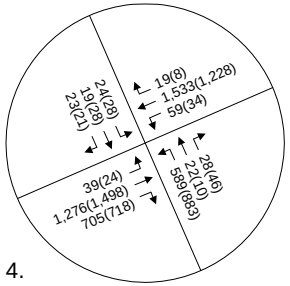
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



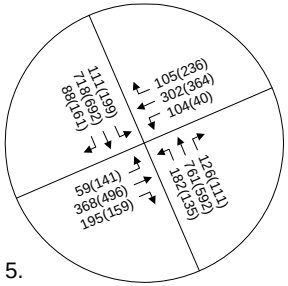
2. Kahului Beach Rd & Wahine Pi'o



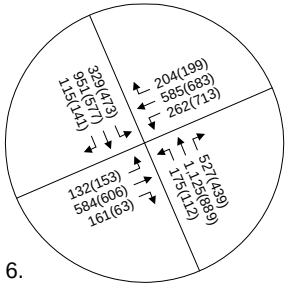
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



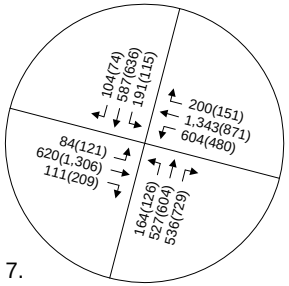
4. Pu'unene Av & Ka'ahumanu Av



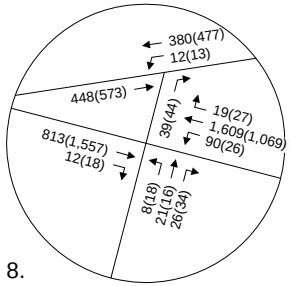
5. Pu'unene Av & Wakea Av



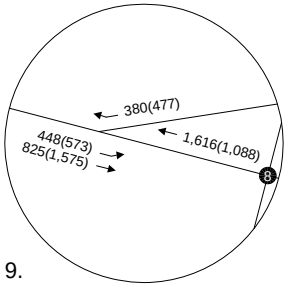
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



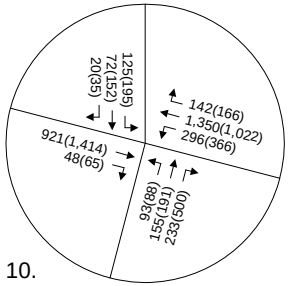
7. Dairy Rd & Hana Hwy



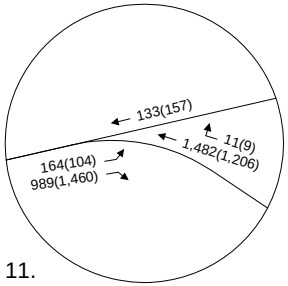
8. Haleakala Hwy/Hanakai St & Hana Hwy



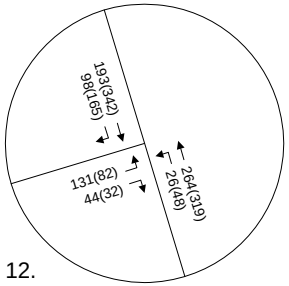
9.



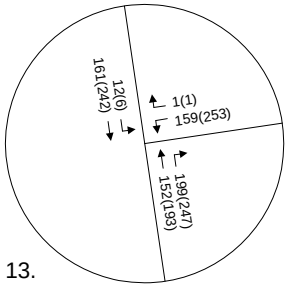
10. Hobron Av/Kamehameha Av & Hana Hwy



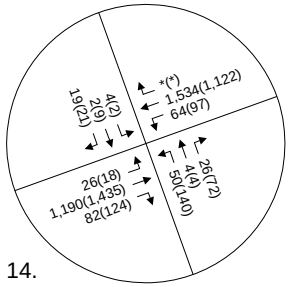
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

#(#) - AM(PM) Volumes

*(*) - Negligible Volumes

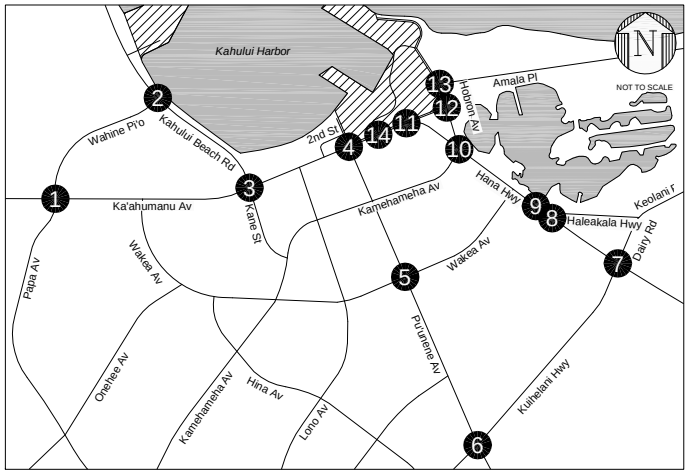


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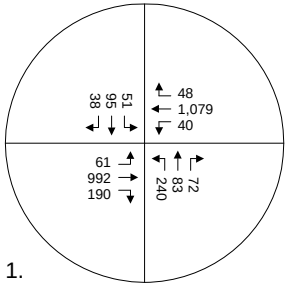
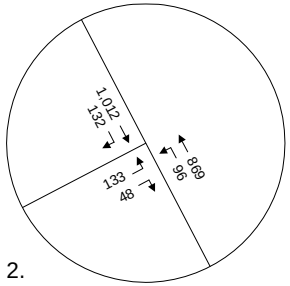
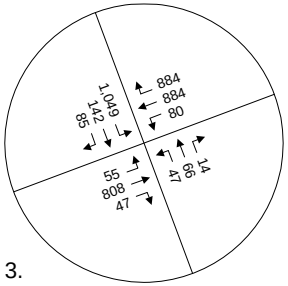
FIGURE 13A
CUMULATIVE PLUS PROJECT ALTERNATIVE B PEAK HOUR VOLUMES



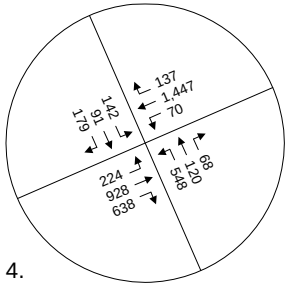
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av



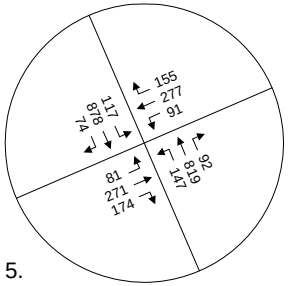
2. Kahului Beach Rd & Wahine Pi'o



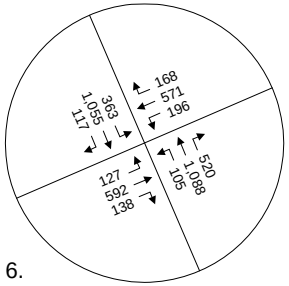
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av



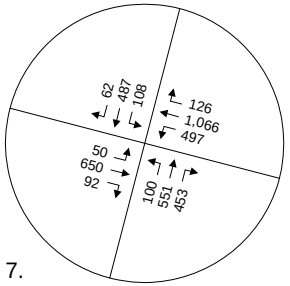
4. Pu'unene Av & Ka'ahumanu Av



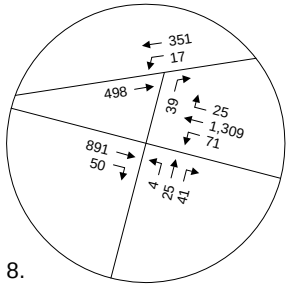
5. Pu'unene Av & Wakea Av



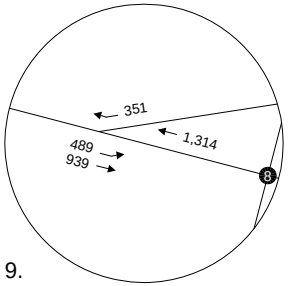
6. Pu'unene Av/Mokulele Hwy & Dairy Rd



7. Dairy Rd & Hana Hwy



8. Haleakala Hwy/Hanakai St & Hana Hwy



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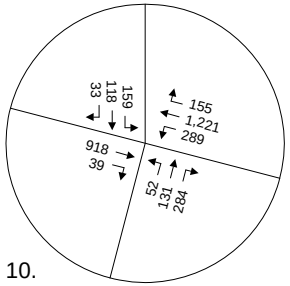
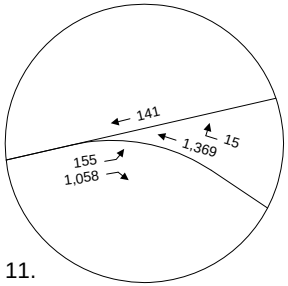
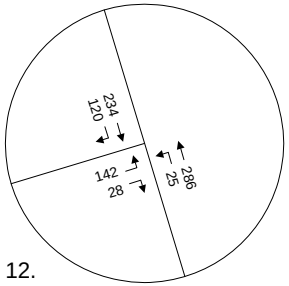


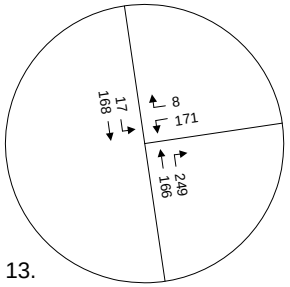
10. Hobron Av/Kamehameha Av & Hana Hwy



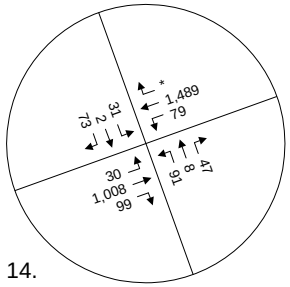
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy



12. Hobron Av & Ka'ahumanu Av



13. Hobron Av & Amala Pl



14. Wharf St & Ka'ahumanu Av

Legend

- Mid-Morning Volumes

* - Negligible Volumes

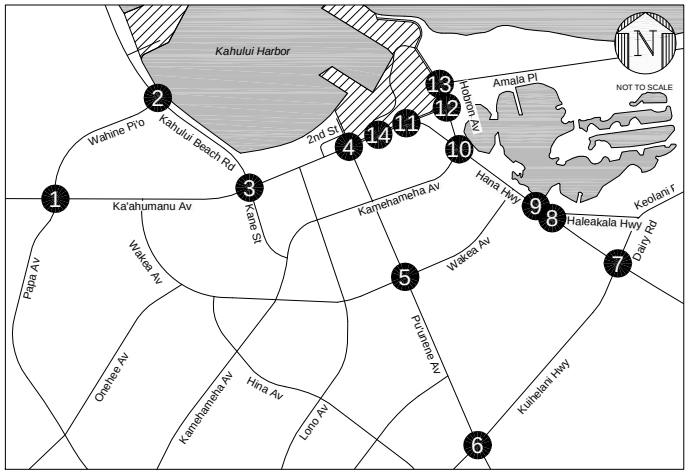


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FIGURE 13B

CUMULATIVE PLUS PROJECT ALTERNATIVE B MID-MORNING PEAK HOUR VOLUMES

TABLE 14
YEAR 2030 CUMULATIVE BASE PLUS PROJECT ALTERNATIVE B CONDITIONS
PEAK HOUR LEVELS OF SERVICE

Intersections	Control	Peak Hour	2030 Cumulative Base No Action		2030 Cumulative plus Project Alt B		Del/Veh Change	Cumulative Impact?	Significant Adverse Effect?	2030 + Project Alt B with Mitigation		Cumulative Impact?
			Del/Veh[1]	LOS	Del/Veh[1]	LOS				Del/Veh[1]	LOS	
1. Ka'ahumanu Av		A.M.	27.6	C	28.7	C	1.1	NO	NO			
& Papa Av/Wahine Pi'o	Signalized	Mid-A.M.	19.7	B	20.5	C	0.8	NO	NO			
		P.M.	22.3	C	22.5	C	0.2	NO	NO			
2. Wahine Pi'o		A.M.	12.1	B	12.9	B	0.8	NO	NO			
& Kahului Beach Rd	Signalized	Mid-A.M.	9.0	A	9.3	A	0.3	NO	NO			
		P.M.	11.5	B	11.8	B	0.3	NO	NO			
3. Ka'ahumanu Av		A.M.	30.3	C	30.8	C	0.5	NO	NO			
& Kahului Beach Rd/Kane St	Signalized	Mid-A.M.	27.2	C	27.9	C	0.7	NO	NO			
		P.M.	42.4	D	44.1	D	1.7	NO	NO			
4. Ka'ahumanu Av		A.M.	22.1	C	22.5	C	0.4	NO	NO	21.8	C	NO
& Pu'unene Av	Signalized	Mid-A.M.	54.7	D	57.5	E	2.8	YES	YES	38.9	D	NO
		P.M.	38.4	D	40.0	D	1.6	NO	NO	30.5	C	NO
5. Wakea Av		A.M.	29.3	C	29.6	C	0.3	NO	NO			
& Pu'unene Av	Signalized	Mid-A.M.	27.9	C	27.9	C	0.0	NO	NO			
		P.M.	31.4	C	31.5	C	0.1	NO	NO			
6. Dairy Rd		A.M.	45.1	D	45.7	D	0.6	NO	NO	35.2	D	NO
& Pu'unene Av/Mokulele Hwy	Signalized	Mid-A.M.	40.2	D	41.1	D	0.9	NO	NO	32.0	C	NO
		P.M.	85.7	F	86.6	F	0.9	YES	NO	53.2	D	NO
7. Dairy Rd		A.M.	33.4	C	33.5	C	0.1	NO	NO			
& Hana Hwy	Signalized	Mid-A.M.	26.2	C	26.3	C	0.1	NO	NO			
		P.M.	40.4	D	40.9	D	0.5	NO	NO			
8. Haleakala Hwy/Hanakai St		A.M.	50.0	E	50.7	F	0.7	YES	NO	24.6	C	NO
& Hana Hwy	Side-Street Stop	Mid-A.M.	35.9	E	36.6	E	0.7	YES	NO	20.6	C	NO
	(Signalized)	P.M.	39.2	E	41.1	E	1.9	YES	NO	16.0	B	NO
9. Haleakala Hwy		A.M.	119.5	F	124.4	F	4.9	YES	NO	Intersections 8 & 9 combined,		
& Hana Hwy	Side-Street Stop	Mid-A.M.	54.5	F	58.0	F	3.5	YES	NO	in mitigation, as a single		
		P.M.	48.7	E	57.7	F	9.0	YES	NO	signalized intersection 8		
10. Hobron Av/Kamehameha Av		A.M.	24.9	C	24.3	C	-0.6	NO	NO			
& Hana Hwy	Signalized	Mid-A.M.	23.7	C	23.0	C	-0.7	NO	NO			
		P.M.	54.7	D	51.2	D	-3.5	NO	NO			
11. Ka'ahumanu Av/Hana Hwy		A.M.	26.5	D	23.9	C	-2.6	NO	NO			
& Ka'ahumanu Av	Side-Street Stop	Mid-A.M.	21.9	C	20.1	C	-1.8	NO	NO			
		P.M.	14.2	B	13.9	B	-0.3	NO	NO			
12. Hobron Av		A.M.	19.3	C	17.0	C	-2.3	NO	NO			
& Ka'ahumanu Av	Side-Street Stop	Mid-A.M.	19.9	C	18.4	C	-1.5	NO	NO			
		P.M.	30.3	D	26.7	D	-3.6	NO	NO			
13. Hobron Av		A.M.	24.3	C	18.6	C	-5.7	NO	NO			
& Amala Pl	Side-Street Stop	Mid-A.M.	31.6	D	23.1	C	-8.5	NO	NO			
		P.M.	81.0	F	42.4	E	-38.6	YES	NO			
14. Ka'ahumanu Av		A.M.	7.7	A	7.2	A	-0.5	NO	NO			
& Wharf St	Signalized	Mid-A.M.	10.1	B	9.1	A	-1.0	NO	NO			
		P.M.	12.7	B	11.9	B	-0.8	NO	NO			

Note:
1 Delay indicates average stopped delay per vehicle in seconds for signalized intersections.
For stop-controlled intersections delay is shown for the worst-case intersection approach.

The intersection listed below would experience a significant adverse effect with the addition of the project traffic as the level of service degrades from LOS D to LOS E.

- Ka'ahumanu Avenue & Pu'unene Avenue

Under Alternative B, the project contributes to cumulative impacts at the same three intersections identified for the preferred alternative, Master Plan Alternative A, with a significant adverse project effect at the Ka'ahumanu Avenue and Pu'unene Avenue intersection. With Alternative B, the intersection of Hobron Avenue and Amala Place would improve in the p.m. peak hour from LOS F to E. This is a result of barge cargo operations being moved to new Pier 5.

ALTERNATIVE B PROPOSED MITIGATION MEASURES AND PROJECT CONTRIBUTION

The mitigation program for Alternative B is similar to the proposed project. The project-related component of future traffic growth at the intersections listed above was calculated based on the proportion of project peak hour traffic relative to the total new peak hour 2030 traffic volumes. Fair-share calculations were made for the a.m., mid-morning and p.m. peak hours, and the maximum project contribution was estimated to be between approximately 3% and 10%, as shown in Table 15. The recommended mitigation measures to address the identified deficiencies are described below:

- Ka'ahumanu Avenue and Pu'unene Avenue – The intersection of Ka'ahumanu Avenue and Pu'unene Avenue could be mitigated to LOS D in the mid-morning peak hour with the reconfiguration of the intersection. The new configuration would consist of two northbound left-turn lanes and a through/right lane on the northbound approach, which would be accommodated through the removal of a southbound departure lane. The southbound approach would also need to be reconfigured to a through/right lane and a left-turn lane to ensure that both the northbound and southbound approaches align correctly. Additionally, this mitigation may require a physical reconstruction of the eastbound approach. The reconstruction is necessary to cut back the raised median to provide additional room to clear two lanes turning left from northbound on Pu'unene to westbound on Ka'ahumanu. The project's fair-share contribution to the cost of this mitigation measure is identified as 6.1%.

- Dairy Road and Pu'unene Avenue/Mokulele Highway – The intersection of Dairy Road and Pu'unene Avenue/Mokulele Highway could be mitigated to LOS D with the addition of another southbound left-turn lane. The high volumes of left turns during the p.m. peak

TABLE 15
PROJECT ALTERNATIVE B FAIR SHARE INTERSECTION TRAFFIC CONTRIBUTION

Intersection	Peak Hour	Existing Traffic	2030 With Project Traffic	Project Traffic	Total New Traffic	Project % of new Traffic
Ka'ahumanu Av/ Pu'unene Av	A.M.	3738	4336	26	598	4.3%
	MID-A.M.	4054	4592	46	538	8.6%
	P.M.	4137	4526	20	389	5.1%
	Average	**3976**	**4485**	**31**	**508**	**6.1%**
Pu'unene Av/Mokulele Hwy & Dairy Road	A.M.	4076	5150	25	1074	2.3%
	MID-A.M.	3989	5040	31	1051	2.9%
	P.M.	4328	5048	28	720	3.9%
	Average	**4131**	**5079**	**28**	**948**	**3.0%**
Haleakala Hwy/Hanakai St & Hana Hwy	A.M.	2358	2598	21	240	8.8%
	MID-A.M.	2215	2415	27	200	13.5%
	P.M.	2509	2765	27	256	10.5%
	Average	**2361**	**2593**	**25**	**232**	**10.8%**
Haleakala Hwy & Hana Hwy	A.M.	1880	2064	11	184	6.0%
	MID-A.M.	1647	1803	15	156	9.6%
	P.M.	1508	1661	14	153	9.2%
	Average	**1678**	**1843**	**13**	**164**	**7.9%**
Haleakala Hwy/Hanakai St & Hana Hwy & Haleakala Hwy & Hana Hwy						
	Combined Fair Share					**9.8%**

hour are delayed by the increases in through traffic at this location. In order to accommodate another southbound left-turn lane on Pu'unene Avenue, this mitigation requires the removal of a 15-foot landscaped median at this intersection. With the new configuration at this intersection, the LOS would improve over the 2030 No Action scenario. While this improvement mitigates the impact of the harbor traffic, there is the need to consider regionally-oriented long-term improvements to accommodate anticipated regional traffic growth from West and South Maui. The project's fair-share contribution to the cost of this mitigation measure is identified as 3%.

- Haleakala Highway/Hanakai Street and Hana Highway and Haleakala Highway and Hana Highway – These two stop-controlled intersections are operating poorly under the cumulative base (No Action) scenario and will worsen very slightly with the addition of the proposed project. In order to improve operations at this intersection, the two intersections should be combined into one and signalized. Signal warrant analysis was conducted based on the Peak Hour Warrant presented in the MUTCD. It indicates that a traffic signal installation at this location would be warranted under cumulative plus project conditions. The proposed combined operation will pull the left-turn pocket for eastbound traffic on Hana Highway up to the intersection at Hanakai Street, allowing this movement protected turn status. The lane configuration for this mitigation is shown in Appendix A. With installation of the signal and the combination of the two intersections, the intersection would operate no worse than LOS C for any of the analyzed peak hours. The project's fair-share contribution to the cost of this mitigation measure is identified as 9.8%.

EFFECTIVENESS OF MITIGATION MEASURES

The effectiveness of each of the proposed mitigation measures was assessed using the same techniques used to assess project operating conditions. As illustrated in Table 14, all four project-related impacts would be fully mitigated with the implementation of the proposed mitigation measures. The results indicate that each of these intersections would operate at LOS D or better under future conditions with the addition of the proposed project traffic with the implementation of the recommended mitigation measure.

VI. SUMMARY AND CONCLUSIONS

This study was undertaken to analyze potential traffic impacts of the proposed Kahului Harbor Master Plan Project in the Kahului area on the island of Maui. The following summarizes the key findings of the study:

- The preferred Kahului Harbor Master Plan Project proposes that the harbor will develop a West Breakwater and a Pier 5. At this location, cruise ship and ferry operations will be housed. Pier 5 will be 1,200 feet long with approximately 22 acres of land serving it. The existing operations from Piers 1 and 2 will be transferred to Pier 5 help improve current conditions and to expand the operations at the harbor. Under this preferred project alternative, Pier 1 will increase in length to 2,400 feet with 20.5 acres of land serving it.

- Peak hour capacity analyses were conducted for 14 intersections on the street system in the vicinity of the project site. Ten of the 14 existing intersections operate at LOS D or better during the weekday peak hours.

- The project is expected to generate approximately 107 trips (52 inbound, 55 outbound) during the a.m. peak hour, 141 trips (66 inbound, 75 outbound) in the mid-morning peak hour, and 136 trips (58 inbound, 78 outbound) during the weekday afternoon peak hour.

- Analysis of projected year 2030 cumulative base (No Action) conditions, representing future conditions without the proposed project, indicates that four of the 14 analyzed intersections would experience a cumulative impact. These intersections would operate at LOS E or F during one or both of the a.m. and p.m. peak hours, along with two intersections during the mid-morning peak hour.

- Analysis of projected year 2030 cumulative base plus project (Alternative A) conditions indicates that four of the 14 analyzed intersections would operate at LOS E or F during one or more of the a.m. and p.m. peak hours, and at two intersections during the mid-morning peak hour. Thus, the project would contribute to three cumulative traffic impacts in the vicinity of the harbor.

- Mitigation strategies were developed for 2030 conditions with the project to address identified deficiencies at the three study intersections with projected poor levels of service (LOS E or F). Three of the locations where the project contributed to cumulative impacts would be fully mitigated (i.e., the recommended improvements would result in better levels of service than are projected under No Action conditions).

- Project fair-share contributions to the recommended cumulative mitigation measures were identified on the basis of the maximum proportion of project-related traffic in each of the analyzed peak hours, relative to the total projected traffic growth at each location. The identified contributions range from approximately 5% to 14%.

- A project alternative scenario was also fully evaluated (Alternative B). This involved a lower trip generation than the proposed project and a different configuration of the harbor to accommodate various shipping and tourism operations. The analysis indicates that this project alternative would contribute to the same cumulative traffic impacts that occurred under the preferred project alternative, with the addition of a significant adverse effect in the mid-morning peak hour at Ka'ahumanu Avenue & Pu'unene Avenue. Five of the 14 analyzed intersections would operate at LOS E or F during one or more of the a.m. and p.m. peak hours. Mitigation strategies were developed for Alternative B with the project to address identified deficiencies at the four study intersections with projected poor levels of service (LOS E or F). All four of the identified project-related deficiencies would be fully mitigated (i.e., the recommended improvements would result in better levels of service than projected under cumulative base conditions).

- Project Alternative B fair-share contributions to the recommended cumulative mitigation measures were identified on the basis of the maximum proportion of project-related traffic in each of the analyzed peak hours, relative to the total projected traffic growth at each location. The identified contributions range from approximately 3% to 10%.

REFERENCES

2000 Highway Capacity Manual, Transportation Research Board, 2000.

Manual on Uniform Traffic Control Devices, National Committee on Uniform Traffic Control Devices, 2003.

Maui Island Traffic Impact Fee Report and Comprehensive Roadway Master Plan (Kaku Associates, Inc., November 2006).

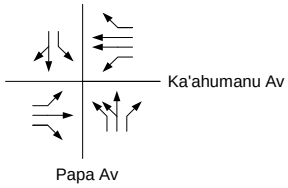
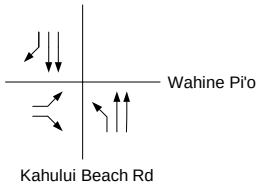
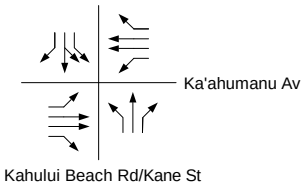
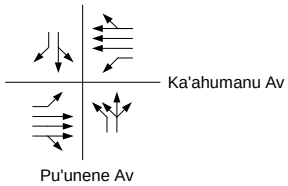
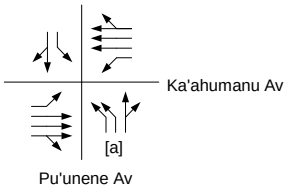
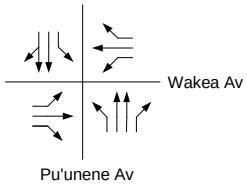
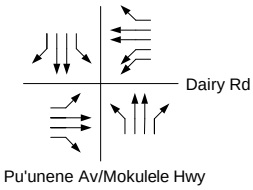
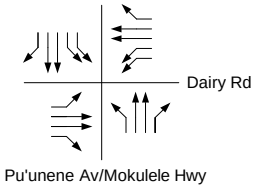
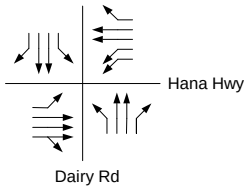
Traffic Study for Kahului Ferry Terminal, CH2M Hill, November 2006.

Trip Generation, 7th Edition, Institute of Transportation Engineers, 2003.

APPENDIX A

INTERSECTION LANE CONFIGURATIONS

INTERSECTION LANE CONFIGURATIONS

	EXISTING CONDITIONS	FUTURE CONDITIONS	FUTURE CONDITIONS WITH MITIGATION
1. Papa Av/Wahine Pi'o & Ka'ahumanu Av		Same As Existing	Same As Existing
2. Kahului Beach Rd & Wahine Pi'o		Same As Existing	Same As Existing
3. Kahului Beach Rd/Kane St & Ka'ahumanu Av		Same As Existing	Same As Existing
4. Pu'unene Av & Ka'ahumanu Av		Same As Existing	
5. Pu'unene Av & Wakea Av		Same As Existing	Same As Existing
6. Pu'unene Av/Mokulele Hwy & Dairy Rd		Same As Existing	
7. Dairy Rd & Hana Hwy		Same As Existing	Same As Existing

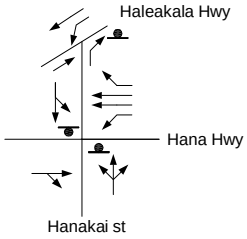
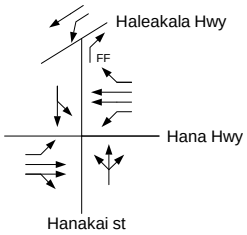
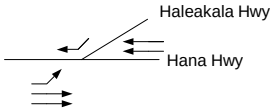
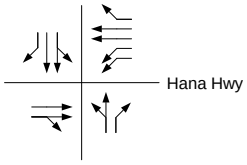
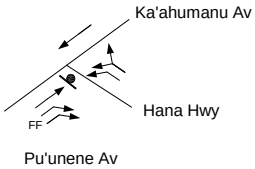
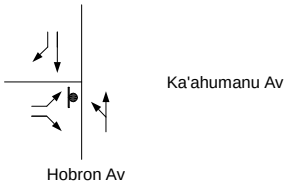
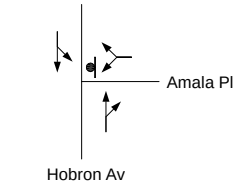
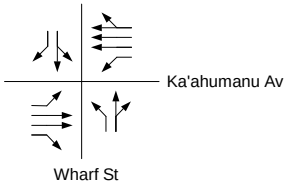
LEGEND

Stop Controlled

[a] Mitigation necessary only with Alternative B.

FEHR & PEERS
KAKU ASSOCIATES

INTERSECTION LANE CONFIGURATIONS

	EXISTING CONDITIONS	FUTURE CONDITIONS	FUTURE CONDITIONS WITH MITIGATION
8. Haleakala Hwy/Hanakai St & Hana Hwy		Same As Existing	
9. Haleakala Hwy & Hana Hwy		Same As Existing	Intersections 8 & 9 are combined in mitigation as a single, signalized Intersection (Intersection 8)
10. Hobron Av/Kamehameha Av & Hana Hwy		Same As Existing	Same As Existing
11. Ka'ahumanu Av & Ka'ahumanu Av/Hana Hwy		Same As Existing	Same As Existing
12. Hobron Av & Ka'ahumanu Av		Same As Existing	Same As Existing
13. Hobron Av & Amala Pl		Same As Existing	Same As Existing
14. Wharf St & Ka'ahumanu Av		Same As Existing	Same As Existing

LEGEND

Stop Controlled

FF Free-flow

FEHR & PEERS

KAKU ASSOCIATES

APPENDIX B

INTERSECTION TRAFFIC COUNTS

WILTEC

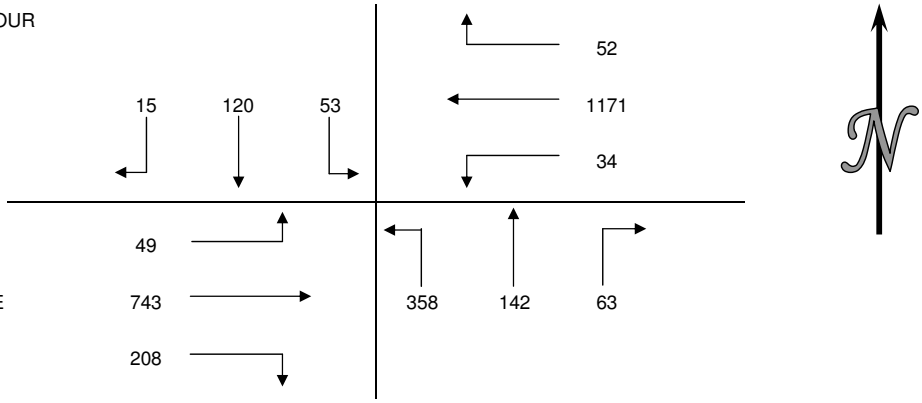
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	PAPA AVENUE / WAHINE PI'O AVENUE
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SORT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	2	31	9	5	241	5	16	28	82	53	143	8	623
715-730	4	40	16	7	258	9	26	39	97	56	164	12	728
730-745	5	42	15	13	293	11	14	45	95	65	166	7	771
745-800	3	35	20	16	305	10	16	33	91	46	190	12	777
800-815	5	23	7	9	288	4	14	35	91	44	192	15	727
815-830	2	20	11	14	285	9	19	29	81	53	195	15	733
830-845	6	31	12	5	257	5	12	25	49	33	192	14	641
845-900	3	28	9	18	274	8	6	17	51	17	184	14	629
900-915	5	19	10	13	255	6	16	21	50	39	176	19	629
915-930	10	25	6	9	251	4	7	19	35	31	178	9	584
930-945	5	17	11	16	239	5	10	25	40	46	194	2	610
945-1000	7	22	9	11	225	7	11	20	66	41	207	16	642
1000-1015	6	30	18	7	214	5	12	12	61	44	211	12	632
1015-1030	6	18	9	10	207	5	16	19	53	43	192	17	595
1030-1045	11	31	11	7	197	9	21	24	50	40	197	15	613
1045-1100	12	23	7	7	202	6	15	32	61	55	199	16	635
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SORT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	14	148	60	41	1097	35	72	145	365	220	663	39	2899
715-815	17	140	58	45	1144	34	70	152	374	211	712	46	3003
730-830	15	120	53	52	1171	34	63	142	358	208	743	49	3008
745-845	16	109	50	44	1135	28	61	122	312	176	769	56	2878
800-900	16	102	39	46	1104	26	51	106	272	147	763	58	2730
815-915	16	98	42	50	1071	28	53	92	231	142	747	62	2632
830-930	24	103	37	45	1037	23	41	82	185	120	730	56	2483
845-945	23	89	36	56	1019	23	39	82	176	133	732	44	2452
900-1000	27	83	36	49	970	22	44	85	191	157	755	46	2465
915-1015	28	94	44	43	929	21	40	76	202	162	790	39	2468
930-1030	24	87	47	44	885	22	49	76	220	174	804	47	2479
945-1045	30	101	47	35	843	26	60	75	230	168	807	60	2482
1000-1100	35	102	45	31	820	25	64	87	225	182	799	60	2475

AM PEAK HOUR
730-830



KA'AHUMANU AVENUE

PAPA AVENUE / WAHINE PI'O AVENUE

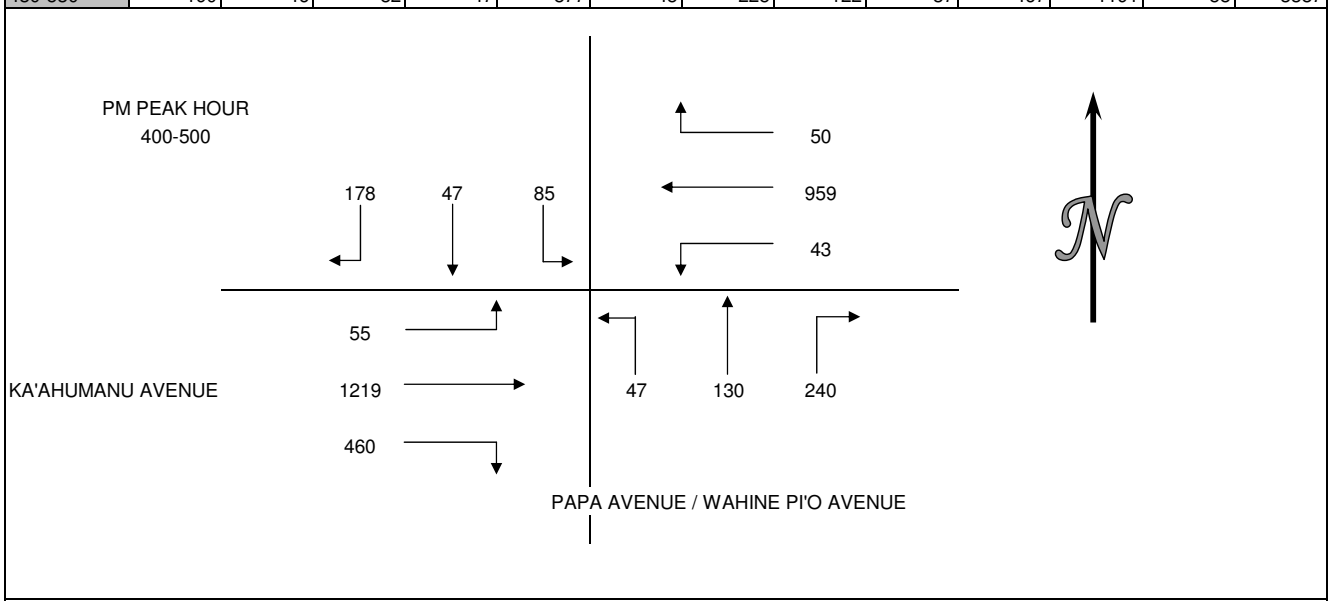
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	PAPA AVENUE / WAHINE PI'O AVENUE
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	40	8	16	10	213	12	44	18	5	96	280	9	751
345-400	34	5	11	6	230	5	51	26	5	107	288	8	776
400-415	43	10	17	14	245	9	55	32	18	112	294	11	860
415-430	47	11	22	15	240	13	67	30	13	114	314	16	902
430-445	41	12	29	6	240	7	62	42	12	115	308	11	885
445-500	47	14	17	15	234	14	56	26	4	119	303	17	866
500-515	55	11	19	13	205	10	57	21	14	121	305	11	842
515-530	47	9	17	13	198	14	50	33	7	112	275	19	794
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	164	34	66	45	928	39	217	106	41	429	1176	44	3289
345-445	165	38	79	41	955	34	235	130	48	448	1204	46	3423
400-500	178	47	85	50	959	43	240	130	47	460	1219	55	3513
415-515	190	48	87	49	919	44	242	119	43	469	1230	55	3495
430-530	190	46	82	47	877	45	225	122	37	467	1191	58	3387



WILTEC

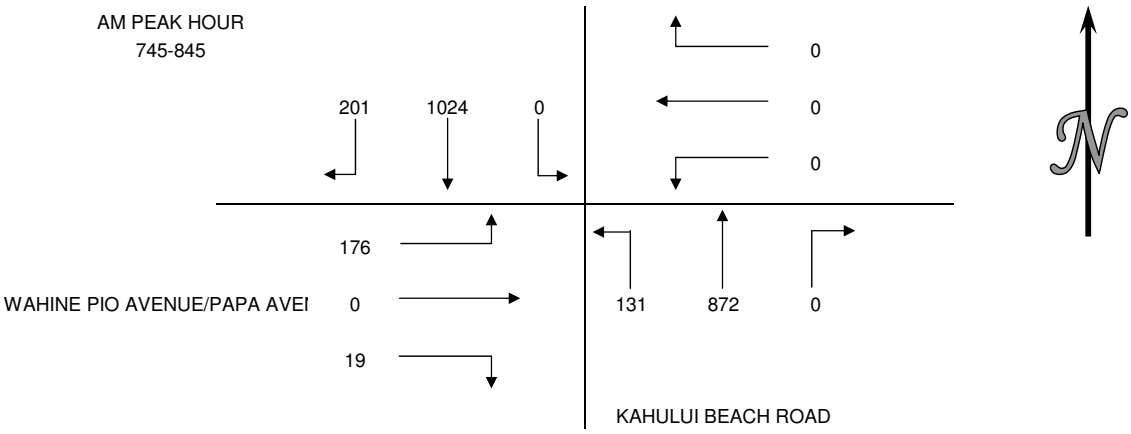
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	KAHULUI BEACH ROAD
	E/W	WAHINE PIO AVENUE/PAPA AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	52	224	0	0	0	0	0	178	14	3	0	31	502
715-730	55	233	0	0	0	0	0	197	19	1	0	49	554
730-745	51	235	0	0	0	0	0	204	25	1	0	58	574
745-800	58	244	0	0	0	0	0	227	30	8	0	57	624
800-815	49	246	0	0	0	0	0	213	27	1	0	51	587
815-830	52	273	0	0	0	0	0	218	36	6	0	43	628
830-845	42	261	0	0	0	0	0	214	38	4	0	25	584
845-900	48	249	0	0	0	0	0	210	37	7	0	27	578
900-915	39	248	0	0	0	0	0	203	25	8	0	34	557
915-930	38	215	0	0	0	0	0	203	25	7	0	34	522
930-945	38	228	0	0	0	0	0	186	36	12	0	37	537
945-1000	24	203	0	0	0	0	0	176	23	15	0	23	464
1000-1015	21	198	0	0	0	0	0	163	12	7	0	30	431
1015-1030	27	184	0	0	0	0	0	154	17	10	0	23	415
1030-1045	31	189	0	0	0	0	0	133	8	9	0	24	394
1045-1100	36	178	0	0	0	0	0	141	20	18	0	34	427
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	216	936	0	0	0	0	0	806	88	13	0	195	2254
715-815	213	958	0	0	0	0	0	841	101	11	0	215	2339
730-830	210	998	0	0	0	0	0	862	118	16	0	209	2413
745-845	201	1024	0	0	0	0	0	872	131	19	0	176	2423
800-900	191	1029	0	0	0	0	0	855	138	18	0	146	2377
815-915	181	1031	0	0	0	0	0	845	136	25	0	129	2347
830-930	167	973	0	0	0	0	0	830	125	26	0	120	2241
845-945	163	940	0	0	0	0	0	802	123	34	0	132	2194
900-1000	139	894	0	0	0	0	0	768	109	42	0	128	2080
915-1015	121	844	0	0	0	0	0	728	96	41	0	124	1954
930-1030	110	813	0	0	0	0	0	679	88	44	0	113	1847
945-1045	103	774	0	0	0	0	0	626	60	41	0	100	1704
1000-1100	115	749	0	0	0	0	0	591	57	44	0	111	1667

AM PEAK HOUR
745-845



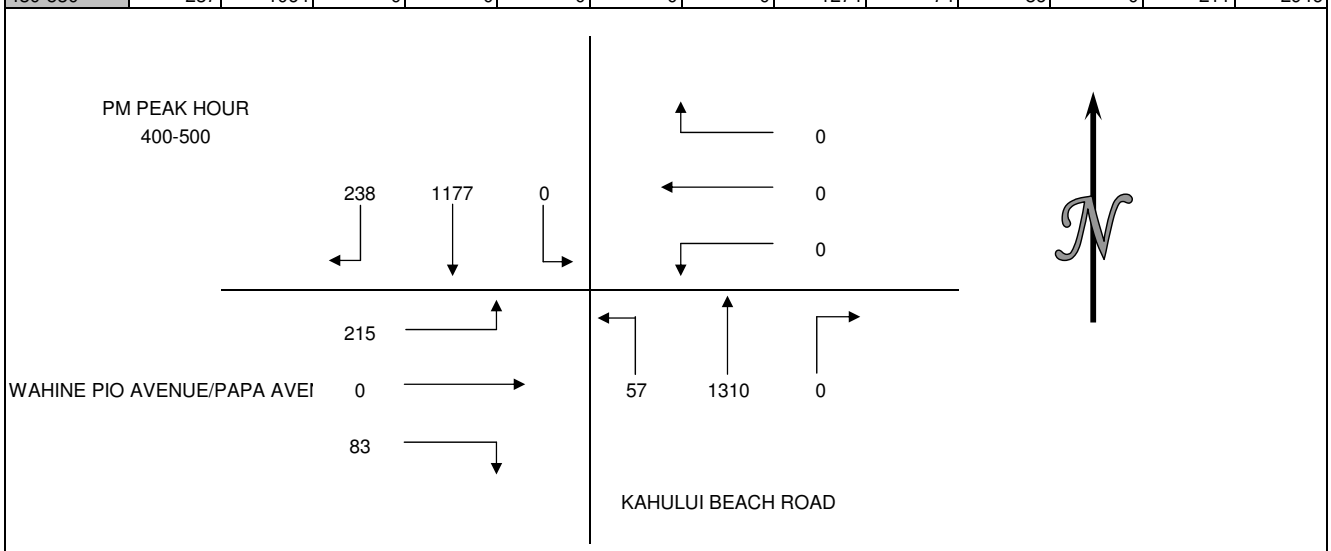
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	KAHULUI BEACH ROAD
	E/W	WAHINE PIO AVENUE/PAPA AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	44	295	0	0	0	0	0	326	16	14	0	51	746
345-400	59	314	0	0	0	0	0	320	13	13	0	45	764
400-415	63	316	0	0	0	0	0	343	6	18	0	55	801
415-430	55	297	0	0	0	0	0	312	19	22	0	58	763
430-445	56	273	0	0	0	0	0	331	16	17	0	51	744
445-500	64	291	0	0	0	0	0	324	16	26	0	51	772
500-515	58	251	0	0	0	0	0	304	14	26	0	55	708
515-530	59	249	0	0	0	0	0	315	28	17	0	54	722
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	221	1222	0	0	0	0	0	1301	54	67	0	209	3074
345-445	233	1200	0	0	0	0	0	1306	54	70	0	209	3072
400-500	238	1177	0	0	0	0	0	1310	57	83	0	215	3080
415-515	233	1112	0	0	0	0	0	1271	65	91	0	215	2987
430-530	237	1064	0	0	0	0	0	1274	74	86	0	211	2946



WILTEC

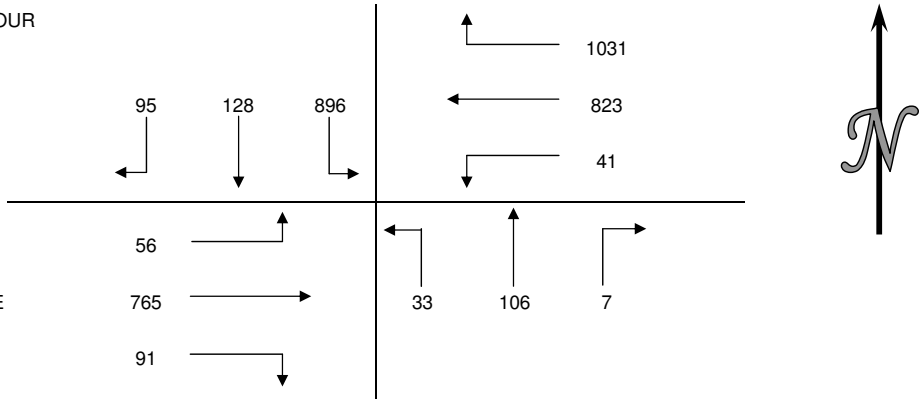
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		TUESDAY APRIL 17, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	KKAHULUI BEACH ROAD / KANE STREET
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	23	33	219	191	188	3	4	29	8	17	160	6	881
715-730	28	37	214	229	192	4	3	39	16	20	178	10	970
730-745	34	30	228	271	189	7	3	31	7	20	177	17	1014
745-800	20	33	223	255	205	13	2	26	9	31	189	16	1022
800-815	26	30	220	250	211	10	1	30	9	21	198	15	1021
815-830	15	35	225	255	218	11	1	19	8	19	201	8	1015
830-845	17	33	209	244	222	11	2	22	13	15	195	10	993
845-900	24	28	201	226	229	11	2	16	7	16	194	11	965
900-915	31	28	209	199	238	4	4	9	4	13	183	15	937
915-930	22	27	186	176	205	10	1	10	7	15	177	7	843
930-945	14	30	193	182	175	23	1	15	9	12	167	10	831
945-1000	16	32	198	190	185	13	2	16	9	8	163	12	844
1000-1015	25	36	197	161	188	21	5	18	14	14	147	12	838
1015-1030	23	32	209	159	155	16	5	11	11	9	153	16	799
1030-1045	17	33	197	153	160	30	10	14	19	18	155	9	815
1045-1100	15	39	182	154	161	14	9	26	12	20	157	16	805
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	105	133	884	946	774	27	12	125	40	88	704	49	3887
715-815	108	130	885	1005	797	34	9	126	41	92	742	58	4027
730-830	95	128	896	1031	823	41	7	106	33	91	765	56	4072
745-845	78	131	877	1004	856	45	6	97	39	86	783	49	4051
800-900	82	126	855	975	880	43	6	87	37	71	788	44	3994
815-915	87	124	844	924	907	37	9	66	32	63	773	44	3910
830-930	94	116	805	845	894	36	9	57	31	59	749	43	3738
845-945	91	113	789	783	847	48	8	50	27	56	721	43	3576
900-1000	83	117	786	747	803	50	8	50	29	48	690	44	3455
915-1015	77	125	774	709	753	67	9	59	39	49	654	41	3356
930-1030	78	130	797	692	703	73	13	60	43	43	630	50	3312
945-1045	81	133	801	663	688	80	22	59	53	49	618	49	3296
1000-1100	80	140	785	627	664	81	29	69	56	61	612	53	3257

AM PEAK HOUR
730-830



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		TUESDAY APRIL 17, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	KAHULUI BEACH ROAD / KANE STREET
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	37	42	247	301	167	15	3	37	16	32	271	12	1180
345-400	35	43	242	293	147	20	10	33	12	30	265	15	1145
400-415	42	39	232	282	178	21	12	37	15	31	251	24	1164
415-430	34	38	230	301	170	17	11	40	19	31	268	14	1173
430-445	35	37	249	281	180	21	7	43	18	17	278	12	1178
445-500	36	36	243	297	163	13	5	28	14	21	263	19	1138
500-515	23	39	230	306	177	18	13	29	15	37	254	18	1159
515-530	43	28	235	271	152	22	6	34	17	45	256	24	1133
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	148	162	951	1177	662	73	36	147	62	124	1055	65	4662
345-445	146	157	953	1157	675	79	40	153	64	109	1062	65	4660
400-500	147	150	954	1161	691	72	35	148	66	100	1060	69	4653
415-515	128	150	952	1185	690	69	36	140	66	106	1063	63	4648
430-530	137	140	957	1155	672	74	31	134	64	120	1051	73	4608

WILTEC

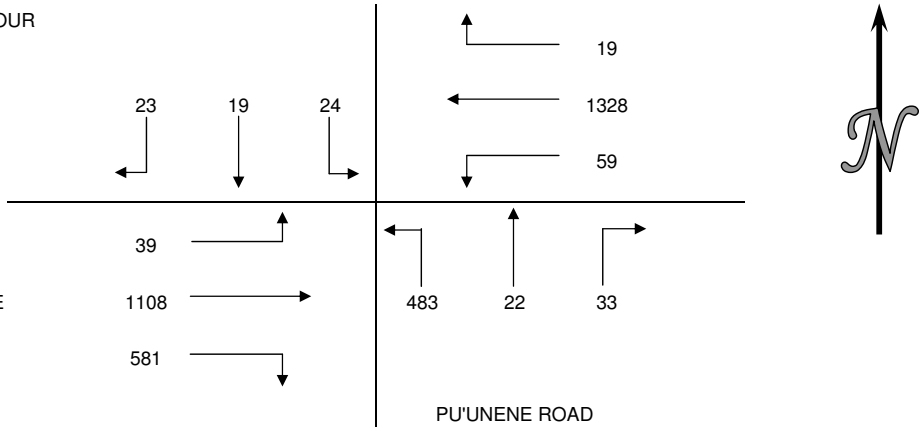
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		TUESDAY APRIL 17, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	PU'UNENE ROAD
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	5	6	3	2	301	10	6	3	68	112	225	9	750
715-730	2	0	0	1	326	6	2	2	119	124	263	6	851
730-745	3	2	2	2	334	5	8	1	120	138	277	7	899
745-800	7	3	2	9	329	10	9	2	119	149	282	13	934
800-815	4	4	3	2	349	16	3	3	125	145	292	8	954
815-830	9	5	9	6	328	14	13	11	120	140	274	12	941
830-845	3	7	10	2	322	19	8	6	119	147	260	6	909
845-900	3	12	10	9	322	13	13	13	108	146	247	14	910
900-915	4	8	6	3	325	10	8	13	116	133	203	16	845
915-930	18	16	13	11	303	15	17	18	117	135	224	21	908
930-945	4	7	3	10	309	12	7	8	102	123	219	13	817
945-1000	10	18	14	6	311	10	21	21	122	137	223	12	905
1000-1015	17	14	22	14	312	19	28	20	97	130	192	19	884
1015-1030	12	2	11	9	293	16	12	9	121	124	172	13	794
1030-1045	9	5	9	8	258	12	15	10	105	114	162	9	716
1045-1100	10	7	9	12	240	15	11	14	112	111	159	8	708
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	17	11	7	14	1290	31	25	8	426	523	1047	35	3434
715-815	16	9	7	14	1338	37	22	8	483	556	1114	34	3638
730-830	23	14	16	19	1340	45	33	17	484	572	1125	40	3728
745-845	23	19	24	19	1328	59	33	22	483	581	1108	39	3738
800-900	19	28	32	19	1321	62	37	33	472	578	1073	40	3714
815-915	19	32	35	20	1297	56	42	43	463	566	984	48	3605
830-930	28	43	39	25	1272	57	46	50	460	561	934	57	3572
845-945	29	43	32	33	1259	50	45	52	443	537	893	64	3480
900-1000	36	49	36	30	1248	47	53	60	457	528	869	62	3475
915-1015	49	55	52	41	1235	56	73	67	438	525	858	65	3514
930-1030	43	41	50	39	1225	57	68	58	442	514	806	57	3400
945-1045	48	39	56	37	1174	57	76	60	445	505	749	53	3299
1000-1100	48	28	51	43	1103	62	66	53	435	479	685	49	3102

AM PEAK HOUR
745-845



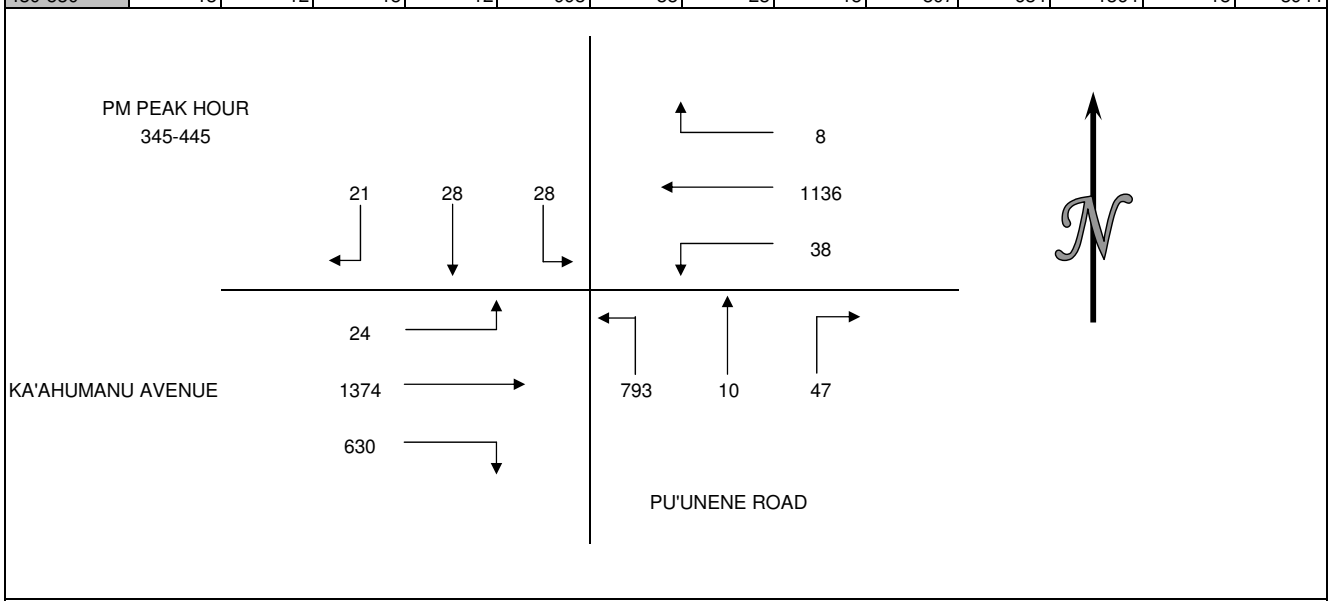
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		TUESDAY APRIL 17, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	PU'UNENE ROAD
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	11	14	14	12	269	11	38	32	162	131	309	16	1019
345-400	10	7	7	3	285	9	23	3	187	150	337	10	1031
400-415	7	9	9	1	280	9	13	3	192	147	347	7	1024
415-430	2	7	7	3	298	16	7	2	208	159	342	4	1055
430-445	2	5	5	1	273	4	4	2	206	174	348	3	1027
445-500	2	3	3	5	262	7	8	8	204	170	342	3	1017
500-515	6	2	3	3	234	12	8	3	199	162	340	8	980
515-530	3	2	4	3	224	15	3	2	198	128	334	4	920
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	30	37	37	19	1132	45	81	40	749	587	1335	37	4129
345-445	21	28	28	8	1136	38	47	10	793	630	1374	24	4137
400-500	13	24	24	10	1113	36	32	15	810	650	1379	17	4123
415-515	12	17	18	12	1067	39	27	15	817	665	1372	18	4079
430-530	13	12	15	12	993	38	23	15	807	634	1364	18	3944



WILTEC

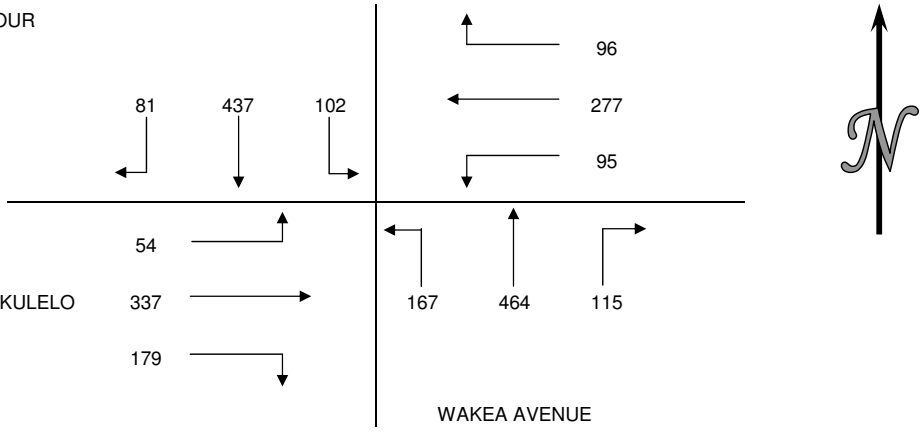
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		WEDNESDAY APRIL 18, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	WAKEA AVENUE
	E/W	PU'UNENE ROAD / MOKULELO
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	14	71	14	12	52	24	21	70	25	33	64	10	410
715-730	14	74	30	18	74	17	25	117	35	29	78	16	527
730-745	19	96	29	15	78	26	19	118	35	50	85	20	590
745-800	18	106	25	23	72	22	36	114	56	31	99	12	614
800-815	23	120	22	33	67	28	45	117	35	53	75	13	631
815-830	21	115	26	25	60	19	15	115	41	45	78	9	569
830-845	11	111	18	23	69	21	25	119	33	40	74	13	557
845-900	14	112	19	30	74	25	33	118	43	58	71	11	608
900-915	15	126	27	50	55	28	26	98	32	44	58	13	572
915-930	22	130	22	37	55	21	28	112	26	32	50	17	552
930-945	13	128	35	32	63	28	20	103	33	37	62	17	571
945-1000	15	122	21	34	63	22	25	127	31	43	57	18	578
1000-1015	21	126	26	32	57	20	16	125	33	39	69	20	584
1015-1030	19	119	25	44	71	13	23	105	38	40	60	19	576
1030-1045	14	125	31	37	57	28	24	123	56	26	62	17	600
1045-1100	19	128	23	33	67	23	29	116	6	35	74	17	570
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	65	347	98	68	276	89	101	419	151	143	326	58	2141
715-815	74	396	106	89	291	93	125	466	161	163	337	61	2362
730-830	81	437	102	96	277	95	115	464	167	179	337	54	2404
745-845	73	452	91	104	268	90	121	465	165	169	326	47	2371
800-900	69	458	85	111	270	93	118	469	152	196	298	46	2365
815-915	61	464	90	128	258	93	99	450	149	187	281	46	2306
830-930	62	479	86	140	253	95	112	447	134	174	253	54	2289
845-945	64	496	103	149	247	102	107	431	134	171	241	58	2303
900-1000	65	506	105	153	236	99	99	440	122	156	227	65	2273
915-1015	71	506	104	135	238	91	89	467	123	151	238	72	2285
930-1030	68	495	107	142	254	83	84	460	135	159	248	74	2309
945-1045	69	492	103	147	248	83	88	480	158	148	248	74	2338
1000-1100	73	498	105	146	252	84	92	469	133	140	265	73	2330

AM PEAK HOUR
730-830



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

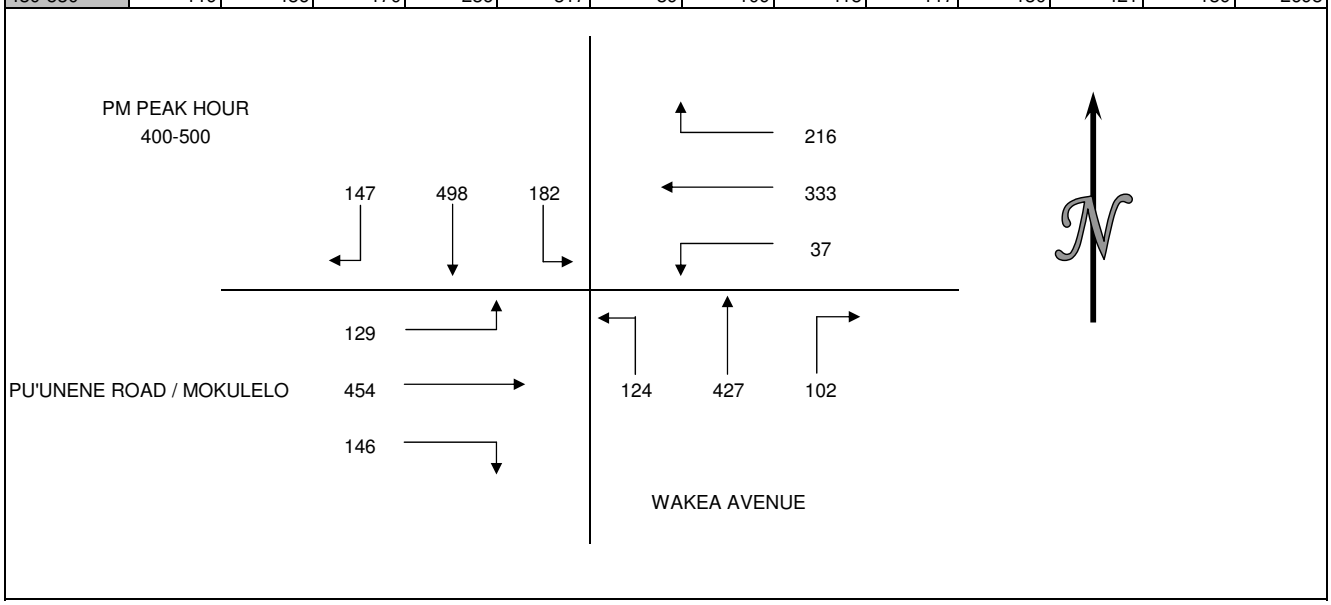
CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		WEDNESDAY APRIL 18, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	WAKEA AVENUE
	E/W	PU'UNENE ROAD / MOKULELO
CITY:		KAHULUI, HAWAII

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-345	28	129	32	50	85	6	21	111	29	36	96	28	651
345-400	26	139	43	47	83	15	19	115	34	44	108	31	704
400-415	43	123	51	44	83	5	18	108	33	40	123	29	700
415-430	37	115	40	49	82	13	27	111	28	39	116	33	690
430-445	34	123	47	60	79	9	27	103	29	37	114	37	699
445-500	33	137	44	63	89	10	30	105	34	30	101	30	706
500-515	28	123	46	52	75	6	29	110	27	26	109	41	672
515-530	24	103	33	61	74	14	23	97	27	37	97	31	621

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-430	134	506	166	190	333	39	85	445	124	159	443	121	2745
345-445	140	500	181	200	327	42	91	437	124	160	461	130	2793
400-500	147	498	182	216	333	37	102	427	124	146	454	129	2795
415-515	132	498	177	224	325	38	113	429	118	132	440	141	2767
430-530	119	486	170	236	317	39	109	415	117	130	421	139	2698



WILTEC

Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		WEDNESDAY APRIL 18, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	PU'UENE ROAD / MOKULELE HIGHWAY
	E/W	DAIRY ROAD / KUIHELANI HIGHWAY
CITY:		KAHULUI, HAWAII

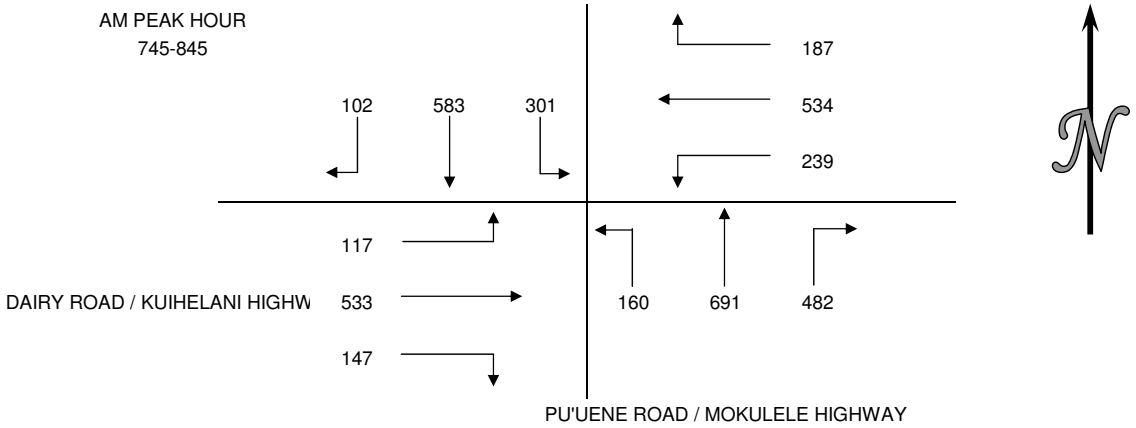
15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-715	30	121	51	35	108	65	109	141	29	32	129	22	872
715-730	21	135	72	36	102	62	120	171	30	42	134	24	949
730-745	32	139	86	41	110	60	129	183	33	42	130	26	1011
745-800	26	162	76	55	138	66	116	190	45	36	133	31	1074
800-815	26	139	73	30	127	65	127	177	40	35	125	28	992
815-830	22	146	77	55	139	40	121	165	40	32	137	22	996
830-845	28	136	75	47	130	68	118	159	35	44	138	36	1014
845-900	16	143	86	44	126	68	127	162	46	37	136	36	1027
900-915	33	158	76	43	136	56	137	146	24	36	139	20	1004
915-930	21	152	75	38	118	61	126	149	26	22	146	24	958
930-945	16	154	77	29	130	52	127	168	33	22	135	21	964
945-1000	16	149	84	31	136	45	115	145	24	20	150	29	944
1000-1015	30	156	85	46	130	40	119	157	21	35	131	25	975
1015-1030	28	157	86	48	124	42	114	167	18	49	123	25	981
1030-1045	16	138	62	38	122	58	116	151	25	34	119	23	902
1045-1100	23	131	65	32	115	54	119	143	16	42	123	17	880

HOUR TOTALS

TIME	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
700-800	109	557	285	167	458	253	474	685	137	152	526	103	3906
715-815	105	575	307	162	477	253	492	721	148	155	522	109	4026
730-830	106	586	312	181	514	231	493	715	158	145	525	107	4073
745-845	102	583	301	187	534	239	482	691	160	147	533	117	4076
800-900	92	564	311	176	522	241	493	663	161	148	536	122	4029
815-915	99	583	314	189	531	232	503	632	145	149	550	114	4041
830-930	98	589	312	172	510	253	508	616	131	139	559	116	4003
845-945	86	607	314	154	510	237	517	625	129	117	556	101	3953
900-1000	86	613	312	141	520	214	505	608	107	100	570	94	3870
915-1015	83	611	321	144	514	198	487	619	104	99	562	99	3841
930-1030	90	616	332	154	520	179	475	637	96	126	539	100	3864
945-1045	90	600	317	163	512	185	464	620	88	138	523	102	3802
1000-1100	97	582	298	164	491	194	468	618	80	160	496	90	3738

AM PEAK HOUR
745-845



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

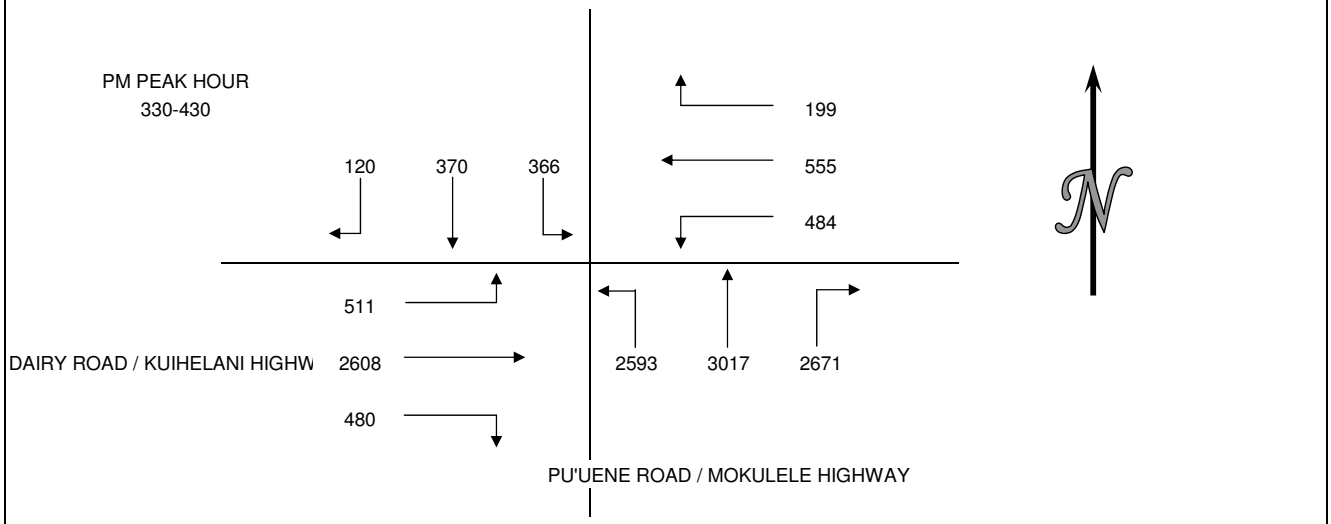
CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		WEDNESDAY APRIL 18, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	PU'UENE ROAD / MOKULELE HIGHWAY
	E/W	DAIRY ROAD / KUIHELANI HIGHWAY
CITY:		KAHULUI, HAWAII

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-345	29	115	99	45	163	106	2342	2634	2495	428	2204	412	11072
345-400	28	96	89	43	153	147	92	68	29	16	137	35	933
400-415	30	82	84	58	110	118	126	165	34	26	124	30	987
415-430	33	77	94	53	129	113	111	150	35	10	143	34	982
430-445	32	84	111	64	151	113	90	163	25	8	137	30	1008
445-500	39	120	74	39	142	175	126	161	25	24	147	33	1105
500-515	26	91	116	49	174	170	81	145	32	12	121	24	1041
515-530	28	122	132	30	155	194	104	177	21	14	147	50	1174

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-430	120	370	366	199	555	484	2671	3017	2593	480	2608	511	13974
345-445	123	339	378	218	543	491	419	546	123	60	541	129	3910
400-500	134	363	363	214	532	519	453	639	119	68	551	127	4082
415-515	130	372	395	205	596	571	408	619	117	54	548	121	4136
430-530	125	417	433	182	622	652	401	646	103	58	552	137	4328



WILTEC

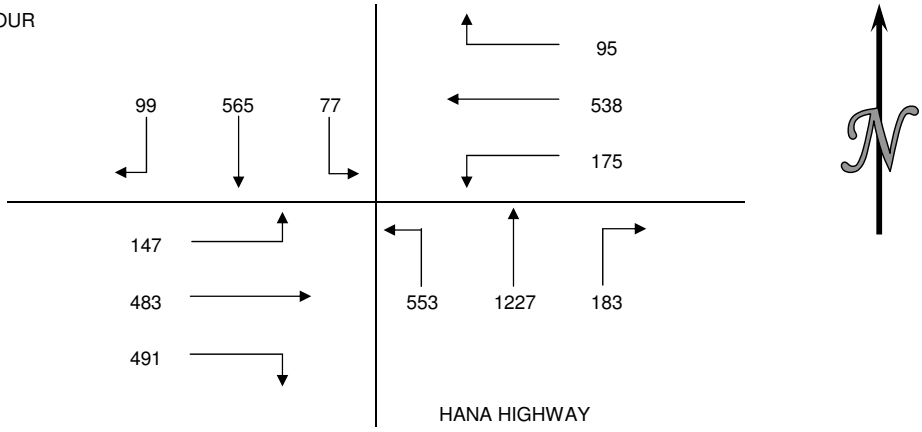
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	DAIRY ROAD
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	26	99	12	13	91	16	22	207	68	61	59	20	694
715-730	27	116	15	10	92	19	36	238	118	77	68	18	834
730-745	30	122	14	12	115	26	34	262	121	78	85	27	926
745-800	26	133	16	13	113	30	43	289	143	82	94	24	1006
800-815	26	136	13	18	123	48	47	304	140	108	101	34	1098
815-830	22	144	15	29	132	53	45	314	139	118	117	45	1173
830-845	28	139	22	27	139	45	54	303	140	120	114	45	1176
845-900	21	142	19	16	139	40	42	307	139	115	126	31	1137
900-915	28	140	21	23	128	37	42	303	135	138	126	26	1147
915-930	21	134	16	23	109	23	38	265	124	117	127	37	1034
930-945	21	137	12	18	110	23	32	234	127	105	133	37	989
945-1000	22	136	9	16	102	24	24	226	112	112	124	20	927
1000-1015	22	125	11	11	115	27	25	237	105	102	120	13	913
1015-1030	16	131	14	12	119	25	34	219	111	96	128	19	924
1030-1045	16	128	14	18	106	29	39	189	106	96	124	28	893
1045-1100	23	120	16	10	109	13	42	201	103	95	115	21	868
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	109	470	57	48	411	91	135	996	450	298	306	89	3460
715-815	109	507	58	53	443	123	160	1093	522	345	348	103	3864
730-830	104	535	58	72	483	157	169	1169	543	386	397	130	4203
745-845	102	552	66	87	507	176	189	1210	562	428	426	148	4453
800-900	97	561	69	90	533	186	188	1228	558	461	458	155	4584
815-915	99	565	77	95	538	175	183	1227	553	491	483	147	4633
830-930	98	555	78	89	515	145	176	1178	538	490	493	139	4494
845-945	91	553	68	80	486	123	154	1109	525	475	512	131	4307
900-1000	92	547	58	80	449	107	136	1028	498	472	510	120	4097
915-1015	86	532	48	68	436	97	119	962	468	436	504	107	3863
930-1030	81	529	46	57	446	99	115	916	455	415	505	89	3753
945-1045	76	520	48	57	442	105	122	871	434	406	496	80	3657
1000-1100	77	504	55	51	449	94	140	846	425	389	487	81	3598

AM PEAK HOUR
815-915



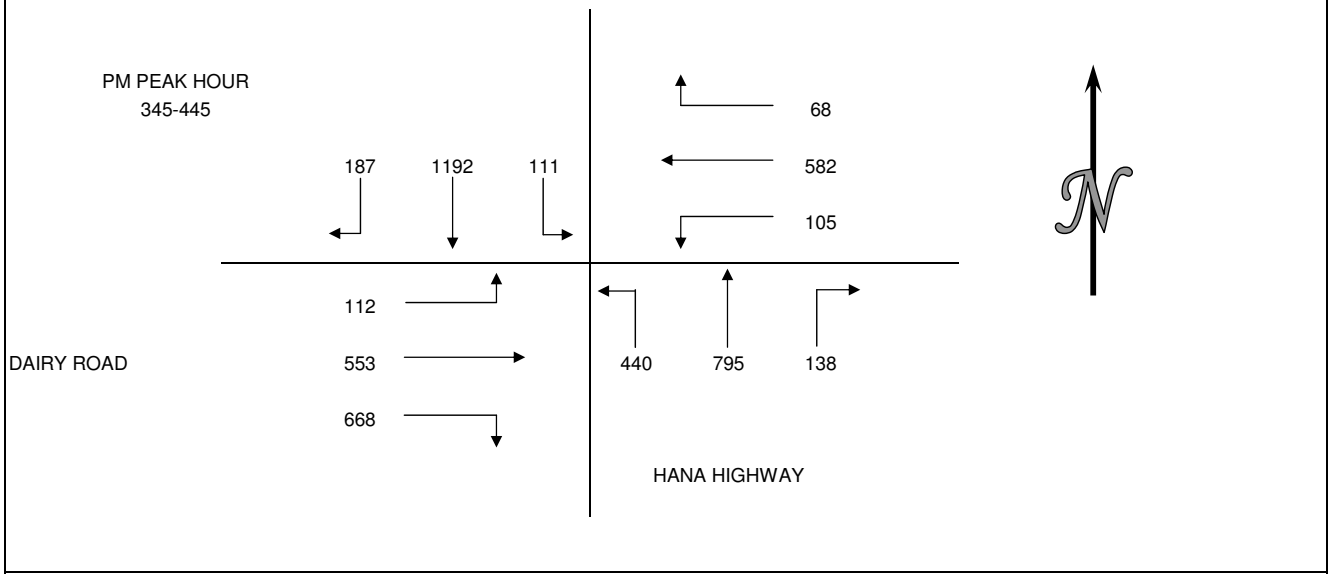
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	DAIRY ROAD
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	37	281	26	11	132	20	42	176	97	143	123	36	1124
345-400	43	298	26	16	146	27	35	188	119	170	142	32	1242
400-415	52	301	25	13	148	24	38	189	114	167	141	29	1241
415-430	55	294	32	21	145	30	33	201	105	166	143	30	1255
430-445	37	299	28	18	143	24	32	217	102	165	127	21	1213
445-500	36	303	22	12	135	20	30	214	92	160	127	31	1182
500-515	22	309	28	12	136	37	34	178	89	171	117	32	1165
515-530	25	303	31	10	122	26	27	162	79	163	119	32	1099
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	187	1174	109	61	571	101	148	754	435	646	549	127	4862
345-445	187	1192	111	68	582	105	138	795	440	668	553	112	4951
400-500	180	1197	107	64	571	98	133	821	413	658	538	111	4891
415-515	150	1205	110	63	559	111	129	810	388	662	514	114	4815
430-530	120	1214	109	52	536	107	123	771	362	659	490	116	4659



WILTEC

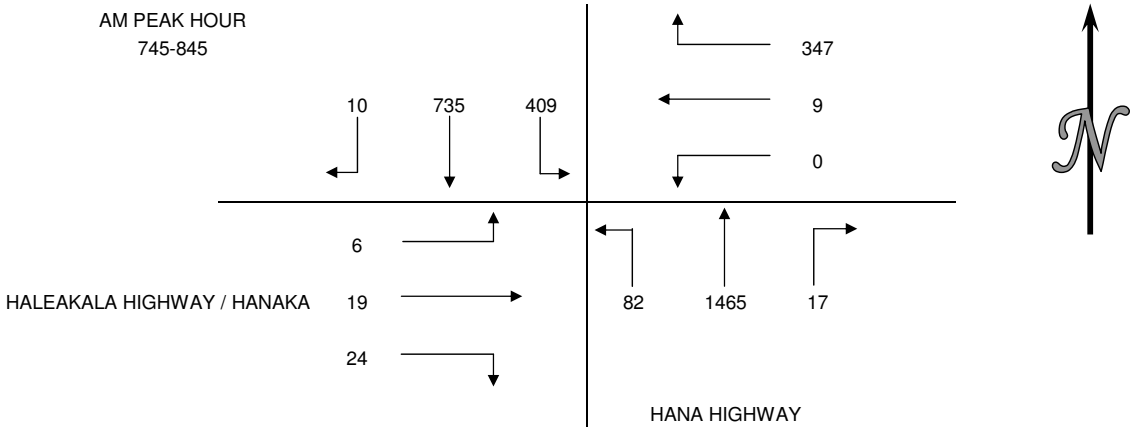
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	HALEAKALA HIGHWAY / HANAKAI STREET
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	2	182	109	57	0	0	1	304	7	3	0	1	666
715-730	3	199	101	58	0	0	4	329	22	3	1	3	723
730-745	2	209	91	67	1	0	4	344	21	5	2	4	750
745-800	2	197	108	82	2	0	2	363	40	3	2	1	802
800-815	2	184	100	89	1	0	4	375	9	9	5	2	780
815-830	3	183	93	89	0	0	3	369	18	7	6	1	772
830-845	3	171	108	87	6	0	8	358	15	5	6	2	769
845-900	4	197	106	62	4	0	8	334	20	5	6	5	751
900-915	12	189	103	76	9	0	6	296	17	5	3	2	718
915-930	11	180	93	87	3	0	4	295	19	11	6	2	711
930-945	7	184	113	74	4	0	2	289	15	10	3	1	702
945-1000	9	174	104	64	3	1	5	286	17	7	4	0	674
1000-1015	13	187	93	75	4	1	6	275	19	11	12	2	698
1015-1030	14	198	91	74	3	0	10	282	14	10	4	0	700
1030-1045	9	181	81	57	0	0	3	256	20	7	9	5	628
1045-1100	13	200	95	66	4	0	14	254	21	6	10	3	686
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	9	787	409	264	3	0	11	1340	90	14	5	9	2941
715-815	9	789	400	296	4	0	14	1411	92	20	10	10	3055
730-830	9	773	392	327	4	0	13	1451	88	24	15	8	3104
745-845	10	735	409	347	9	0	17	1465	82	24	19	6	3123
800-900	12	735	407	327	11	0	23	1436	62	26	23	10	3072
815-915	22	740	410	314	19	0	25	1357	70	22	21	10	3010
830-930	30	737	410	312	22	0	26	1283	71	26	21	11	2949
845-945	34	750	415	299	20	0	20	1214	71	31	18	10	2882
900-1000	39	727	413	301	19	1	17	1166	68	33	16	5	2805
915-1015	40	725	403	300	14	2	17	1145	70	39	25	5	2785
930-1030	43	743	401	287	14	2	23	1132	65	38	23	3	2774
945-1045	45	740	369	270	10	2	24	1099	70	35	29	7	2700
1000-1100	49	766	360	272	11	1	33	1067	74	34	35	10	2712

AM PEAK HOUR
745-845



WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

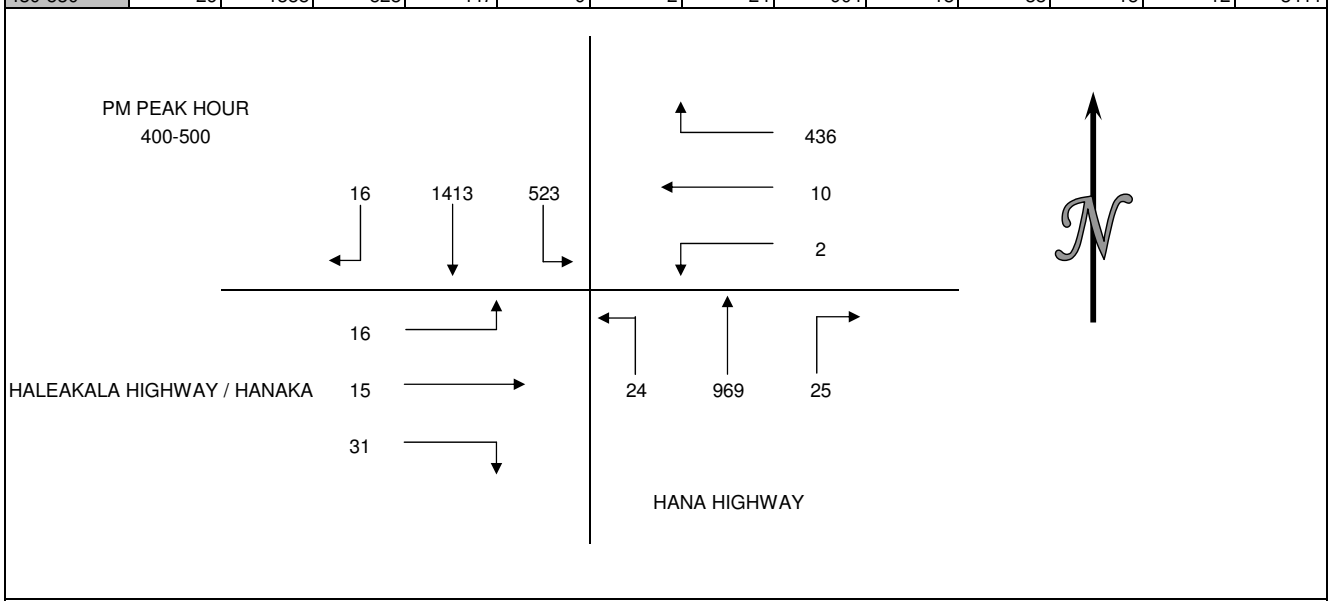
CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	HALEAKALA HIGHWAY / HANAKAI STREET
CITY:		KAHULUI, HAWAII

15 MIN COUNTS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-345	5	327	116	140	6	0	5	237	7	6	1	3	853
345-400	2	347	122	109	5	1	7	235	8	7	0	4	847
400-415	3	344	132	119	1	0	5	237	6	5	3	6	861
415-430	1	357	129	104	3	0	9	242	6	6	5	4	866
430-445	8	366	126	102	5	2	5	259	7	7	4	2	893
445-500	4	346	136	111	1	0	6	231	5	13	3	4	860
500-515	6	341	141	121	0	0	7	212	3	7	5	2	845
515-530	8	335	125	113	3	0	6	202	3	11	3	4	813

HOUR TOTALS

PERIOD	1 SBRT	2 SBTH	3 SBLT	4 WBRT	5 WBTH	6 WBLT	7 NBRT	8 NBTH	9 NBLT	10 EBRT	11 EBTH	12 EBLT	TOTAL
330-430	11	1375	499	472	15	1	26	951	27	24	9	17	3427
345-445	14	1414	509	434	14	3	26	973	27	25	12	16	3467
400-500	16	1413	523	436	10	2	25	969	24	31	15	16	3480
415-515	19	1410	532	438	9	2	27	944	21	33	17	12	3464
430-530	26	1388	528	447	9	2	24	904	18	38	15	12	3411



WILTEC

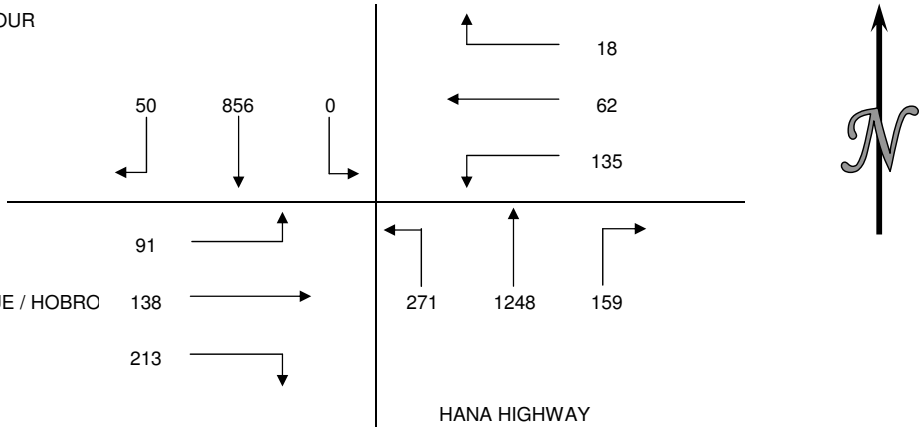
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	KAMEHAMEHA AVENUE / HOBRON AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	7	198	0	2	11	18	34	288	67	38	20	18	701
715-730	12	214	0	4	15	35	39	294	68	49	26	29	785
730-745	17	203	0	3	12	33	32	301	70	50	32	35	788
745-800	18	215	0	1	18	33	41	306	86	67	28	30	843
800-815	5	207	0	1	13	16	30	313	70	40	39	23	757
815-830	2	220	0	4	18	42	45	315	53	46	40	15	800
830-845	25	214	0	12	13	44	43	314	62	60	31	23	841
845-900	17	201	0	4	29	40	43	303	52	55	32	17	793
900-915	6	199	0	6	19	30	45	281	56	56	38	13	749
915-930	9	197	0	4	12	41	45	271	73	42	38	13	745
930-945	7	185	0	11	27	44	46	267	58	49	24	16	734
945-1000	8	187	0	7	29	47	44	276	78	60	31	14	781
1000-1015	12	196	0	4	24	43	44	251	72	73	34	11	764
1015-1030	17	183	0	8	23	32	32	249	57	78	26	14	719
1030-1045	9	164	0	3	27	37	36	229	65	41	32	10	653
1045-1100	20	168	0	9	30	45	33	227	64	58	33	12	699
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	54	830	0	10	56	119	146	1189	291	204	106	112	3117
715-815	52	839	0	9	58	117	142	1214	294	206	125	117	3173
730-830	42	845	0	9	61	124	148	1235	279	203	139	103	3188
745-845	50	856	0	18	62	135	159	1248	271	213	138	91	3241
800-900	49	842	0	21	73	142	161	1245	237	201	142	78	3191
815-915	50	834	0	26	79	156	176	1213	223	217	141	68	3183
830-930	57	811	0	26	73	155	176	1169	243	213	139	66	3128
845-945	39	782	0	25	87	155	179	1122	239	202	132	59	3021
900-1000	30	768	0	28	87	162	180	1095	265	207	131	56	3009
915-1015	36	765	0	26	92	175	179	1065	281	224	127	54	3024
930-1030	44	751	0	30	103	166	166	1043	265	260	115	55	2998
945-1045	46	730	0	22	103	159	156	1005	272	252	123	49	2917
1000-1100	58	711	0	24	104	157	145	956	258	250	125	47	2835

AM PEAK HOUR
745-845



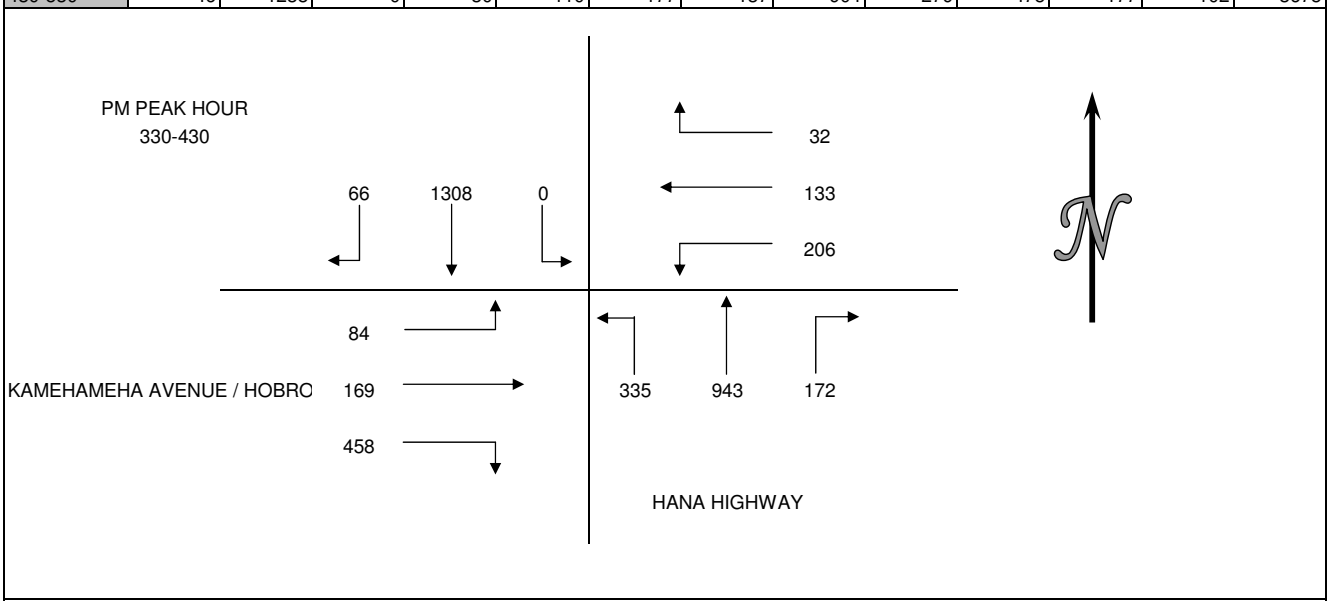
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	KAMEHAMEHA AVENUE / HOBRON AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	17	319	0	8	33	56	48	229	95	107	45	18	975
345-400	9	326	0	12	35	59	42	228	74	112	45	16	958
400-415	23	334	0	7	38	49	38	249	85	114	36	23	996
415-430	17	329	0	5	27	42	44	237	81	125	43	27	977
430-445	12	306	0	8	23	39	43	226	88	123	55	37	960
445-500	12	317	0	6	39	42	37	221	77	136	42	30	959
500-515	6	310	0	5	27	54	31	228	53	110	45	24	893
515-530	16	305	0	11	21	42	26	229	61	106	35	11	863
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	66	1308	0	32	133	206	172	943	335	458	169	84	3906
345-445	61	1295	0	32	123	189	167	940	328	474	179	103	3891
400-500	64	1286	0	26	127	172	162	933	331	498	176	117	3892
415-515	47	1262	0	24	116	177	155	912	299	494	185	118	3789
430-530	46	1238	0	30	110	177	137	904	279	475	177	102	3675



WILTEC

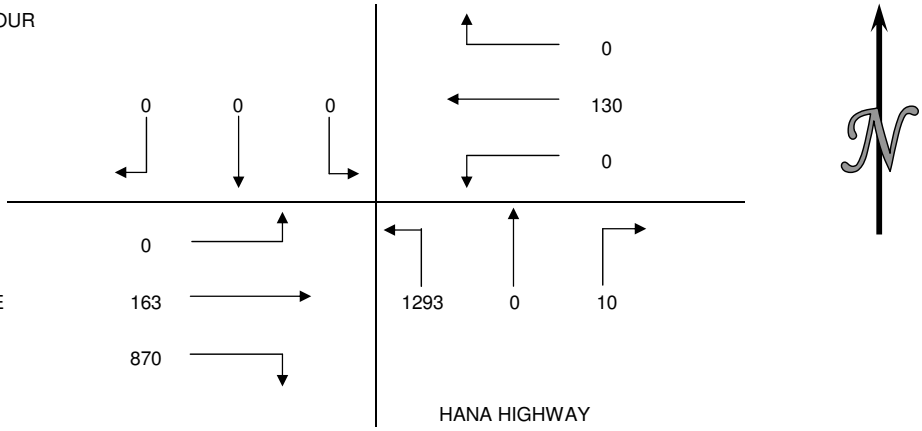
Phone: (626) 564-1944 Fax: (626) 564-0969

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		7:00 AM TO 11:00 AM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-715	0	0	0	0	22	0	0	0	295	197	31	0	545
715-730	0	0	0	0	17	0	1	0	329	203	31	0	581
730-745	0	0	0	0	25	0	3	0	338	211	37	0	614
745-800	0	0	0	0	22	0	0	0	314	223	32	0	591
800-815	0	0	0	0	28	0	4	0	324	221	36	0	613
815-830	0	0	0	0	31	0	3	0	325	221	34	0	614
830-845	0	0	0	0	40	0	1	0	331	225	34	0	631
845-900	0	0	0	0	29	0	3	0	311	217	43	0	603
900-915	0	0	0	0	30	0	3	0	326	207	52	0	618
915-930	0	0	0	0	30	0	1	0	276	218	34	0	559
930-945	0	0	0	0	46	0	2	0	294	211	43	0	596
945-1000	0	0	0	0	27	0	4	0	275	194	34	0	534
1000-1015	0	0	0	0	38	0	7	0	280	221	39	0	585
1015-1030	0	0	0	0	26	0	1	0	266	209	36	0	538
1030-1045	0	0	0	0	32	0	4	0	249	206	32	0	523
1045-1100	0	0	0	0	47	0	3	0	242	194	38	0	524
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
TIME	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
700-800	0	0	0	0	86	0	4	0	1276	834	131	0	2331
715-815	0	0	0	0	92	0	8	0	1305	858	136	0	2399
730-830	0	0	0	0	106	0	10	0	1301	876	139	0	2432
745-845	0	0	0	0	121	0	8	0	1294	890	136	0	2449
800-900	0	0	0	0	128	0	11	0	1291	884	147	0	2461
815-915	0	0	0	0	130	0	10	0	1293	870	163	0	2466
830-930	0	0	0	0	129	0	8	0	1244	867	163	0	2411
845-945	0	0	0	0	135	0	9	0	1207	853	172	0	2376
900-1000	0	0	0	0	133	0	10	0	1171	830	163	0	2307
915-1015	0	0	0	0	141	0	14	0	1125	844	150	0	2274
930-1030	0	0	0	0	137	0	14	0	1115	835	152	0	2253
945-1045	0	0	0	0	123	0	16	0	1070	830	141	0	2180
1000-1100	0	0	0	0	143	0	15	0	1037	830	145	0	2170

AM PEAK HOUR
815-915



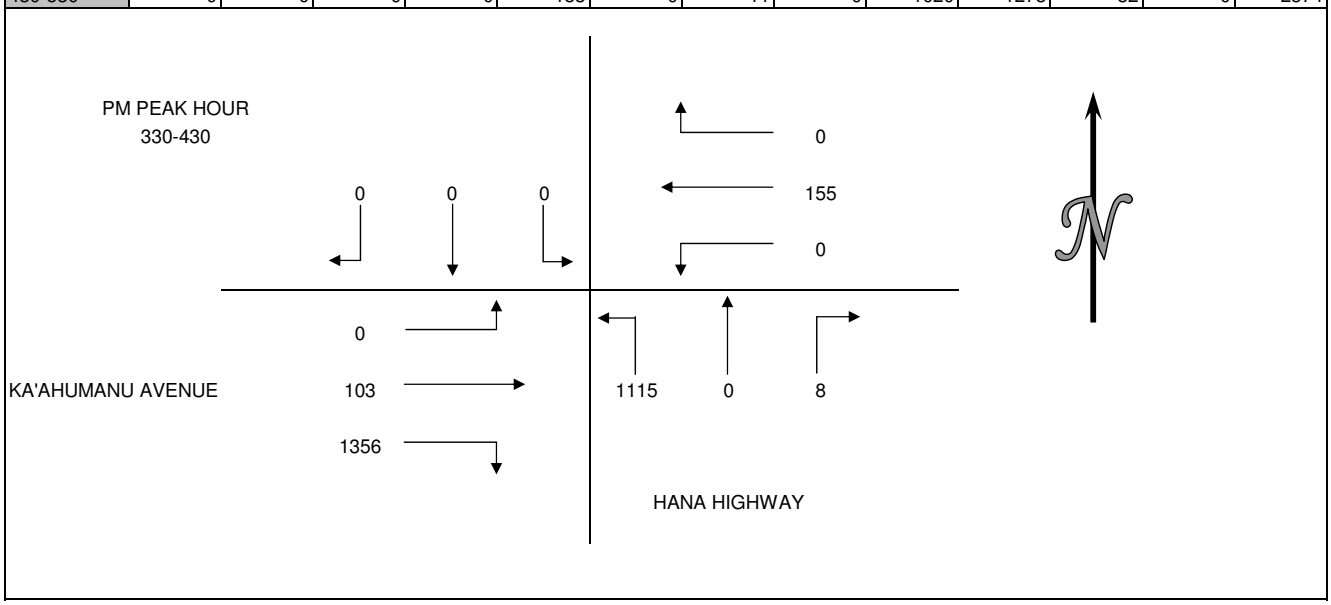
WILTEC

Phone: (925) 706-9911 Fax: (925) 706-9914

INTERSECTION TURNING MOVEMENT COUNT SUMMARY

CLIENT:		FEHR & PEERS / KAKU ASSOCIATES
PROJECT:		KAHULUI
DATE:		THURSDAY APRIL 19, 2007
PERIOD:		3:30 PM TO 5:30 PM
INTERSECTION:	N/S	HANA HIGHWAY
	E/W	KA'AHUMANU AVENUE
CITY:		KAHULUI, HAWAII

15 MIN COUNTS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-345	0	0	0	0	41	0	2	0	285	327	21	0	676
345-400	0	0	0	0	43	0	1	0	281	334	30	0	689
400-415	0	0	0	0	40	0	2	0	276	344	29	0	691
415-430	0	0	0	0	31	0	3	0	273	351	23	0	681
430-445	0	0	0	0	40	0	4	0	257	340	23	0	664
445-500	0	0	0	0	57	0	2	0	251	324	20	0	654
500-515	0	0	0	0	46	0	2	0	258	301	22	0	629
515-530	0	0	0	0	40	0	3	0	254	313	17	0	627
HOUR TOTALS													
	1	2	3	4	5	6	7	8	9	10	11	12	
PERIOD	SBRT	SBTH	SBLT	WBRT	WBTH	WBLT	NBRT	NBTH	NBLT	EBRT	EBTH	EBLT	TOTAL
330-430	0	0	0	0	155	0	8	0	1115	1356	103	0	2737
345-445	0	0	0	0	154	0	10	0	1087	1369	105	0	2725
400-500	0	0	0	0	168	0	11	0	1057	1359	95	0	2690
415-515	0	0	0	0	174	0	11	0	1039	1316	88	0	2628
430-530	0	0	0	0	183	0	11	0	1020	1278	82	0	2574



APPENDIX C

INTERSECTION LEVEL OF SERVICE WORKSHEETS

EXISTING CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1833	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1833	
Volume (vph)	49	743	208	34	1171	52	358	142	63	53	120	15
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	51	766	214	35	1207	54	369	146	65	55	124	15
RTOR Reduction (vph)	0	0	120	0	0	30	0	0	52	0	5	0
Lane Group Flow (vph)	51	766	94	35	1207	24	251	264	13	55	134	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	2.4	32.9	32.9	2.9	33.4	33.4	15.3	15.3	15.3	7.5	7.5	
Effective Green, g (s)	2.4	32.9	32.9	2.9	33.4	33.4	15.3	15.3	15.3	7.5	7.5	
Actuated g/C Ratio	0.03	0.44	0.44	0.04	0.45	0.45	0.21	0.21	0.21	0.10	0.10	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	57	1561	698	69	1584	709	345	355	325	178	184	
v/s Ratio Prot	c0.03	0.22		0.02	c0.34		0.15	c0.15		0.03	c0.07	
v/s Ratio Perm			0.06			0.02			0.01			
v/c Ratio	0.89	0.49	0.14	0.51	0.76	0.03	0.73	0.74	0.04	0.31	0.73	
Uniform Delay, d1	36.0	14.9	12.4	35.1	17.3	11.6	27.7	27.8	23.8	31.1	32.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	81.4	0.2	0.1	5.8	2.2	0.0	7.5	8.2	0.1	1.0	13.3	
Delay (s)	117.4	15.1	12.5	40.9	19.5	11.6	35.2	36.0	23.8	32.1	45.8	
Level of Service	F	B	B	D	B	B	D	D	C	C	D	
Approach Delay (s)		19.6			19.7			34.3			42.0	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1726	1583	1770	1802	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1726	1583	1770	1802	
Volume (vph)	47	875	174	38	950	44	220	76	67	47	87	24
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	48	902	179	39	979	45	227	78	69	48	90	25
RTOR Reduction (vph)	0	0	92	0	0	23	0	0	60	0	12	0
Lane Group Flow (vph)	48	902	87	39	979	22	149	156	9	48	103	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.2	36.7	36.7	4.2	36.7	36.7	10.4	10.4	10.4	8.4	8.4	
Effective Green, g (s)	4.2	36.7	36.7	4.2	36.7	36.7	10.4	10.4	10.4	8.4	8.4	
Actuated g/C Ratio	0.06	0.48	0.48	0.06	0.48	0.48	0.14	0.14	0.14	0.11	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	98	1716	767	98	1716	767	231	237	217	196	200	
v/s Ratio Prot	c0.03	0.25		0.02	c0.28		0.09	c0.09		0.03	c0.06	
v/s Ratio Perm			0.05			0.01			0.01			
v/c Ratio	0.49	0.53	0.11	0.40	0.57	0.03	0.65	0.66	0.04	0.24	0.52	
Uniform Delay, d1	34.7	13.5	10.6	34.5	13.9	10.2	30.9	31.0	28.3	30.8	31.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.8	0.3	0.1	2.6	0.5	0.0	6.1	6.5	0.1	0.7	2.3	
Delay (s)	38.5	13.8	10.7	37.2	14.3	10.2	37.0	37.4	28.4	31.4	34.0	
Level of Service	D	B	B	D	B	B	D	D	C	C	C	
Approach Delay (s)		14.3			15.0			35.6			33.2	
Approach LOS		B			B			D			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1641	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1641	
Volume (vph)	55	1219	460	43	959	50	47	130	240	85	47	178
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	57	1257	474	44	989	52	48	134	247	88	48	184
RTOR Reduction (vph)	0	0	238	0	0	27	0	0	187	0	159	0
Lane Group Flow (vph)	57	1257	236	44	989	25	48	134	60	88	73	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.5	36.3	36.3	2.5	35.3	35.3	10.8	10.8	10.8	7.3	7.3	
Effective Green, g (s)	3.5	36.3	36.3	2.5	35.3	35.3	10.8	10.8	10.8	7.3	7.3	
Actuated g/C Ratio	0.05	0.50	0.50	0.03	0.48	0.48	0.15	0.15	0.15	0.10	0.10	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	85	1762	788	61	1714	767	249	262	235	177	164	
v/s Ratio Prot	c0.03	c0.36		0.02	0.28		0.03	c0.08		c0.05	0.04	
v/s Ratio Perm			0.15			0.02			0.04			
v/c Ratio	0.67	0.71	0.30	0.72	0.58	0.03	0.19	0.51	0.26	0.50	0.44	
Uniform Delay, d1	34.1	14.2	10.8	34.9	13.5	9.9	27.2	28.6	27.5	31.1	30.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.8	1.4	0.2	34.1	0.5	0.0	0.4	1.7	0.6	2.2	1.9	
Delay (s)	53.0	15.6	11.0	69.0	13.9	9.9	27.6	30.3	28.1	33.3	32.8	
Level of Service	D	B	B	E	B	A	C	C	C	C	C	
Approach Delay (s)		15.6			16.0			28.7			32.9	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	72.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	176	19	131	872	1024	201
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	183	20	136	908	1067	209
RTOR Reduction (vph)	0	17	0	0	0	99
Lane Group Flow (vph)	183	3	136	908	1067	110
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	10.4	10.4	9.0	47.8	34.8	34.8
Effective Green, g (s)	10.4	10.4	9.0	47.8	34.8	34.8
Actuated g/C Ratio	0.16	0.16	0.14	0.72	0.53	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	278	249	241	2555	1860	832
v/s Ratio Prot	c0.10		c0.08	0.26	c0.30	
v/s Ratio Perm		0.00				0.07
v/c Ratio	0.66	0.01	0.56	0.36	0.57	0.13
Uniform Delay, d1	26.2	23.6	26.8	3.4	10.7	8.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.0	3.0	0.1	0.4	0.1
Delay (s)	31.8	23.6	29.8	3.5	11.1	8.1
Level of Service	C	C	C	A	B	A
Approach Delay (s)	31.0			6.9	10.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	10.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	113	44	88	771	892	110
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	131	51	102	897	1037	128
RTOR Reduction (vph)	0	44	0	0	0	55
Lane Group Flow (vph)	131	7	102	897	1037	73
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.1	9.1	6.1	45.9	35.8	35.8
Effective Green, g (s)	9.1	9.1	6.1	45.9	35.8	35.8
Actuated g/C Ratio	0.14	0.14	0.10	0.73	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	256	229	171	2578	2011	900
v/s Ratio Prot	c0.07		c0.06	0.25	c0.29	
v/s Ratio Perm		0.00				0.05
v/c Ratio	0.51	0.03	0.60	0.35	0.52	0.08
Uniform Delay, d1	24.9	23.2	27.3	3.1	8.3	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.1	5.5	0.1	0.2	0.0
Delay (s)	26.6	23.2	32.8	3.2	8.5	6.2
Level of Service	C	C	C	A	A	A
Approach Delay (s)	25.7			6.2	8.3	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	215	83	57	1310	1177	238
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	224	86	59	1365	1226	248
RTOR Reduction (vph)	0	69	0	0	0	113
Lane Group Flow (vph)	224	17	59	1365	1226	135
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	13.4	13.4	4.7	44.5	35.8	35.8
Effective Green, g (s)	13.4	13.4	4.7	44.5	35.8	35.8
Actuated g/C Ratio	0.20	0.20	0.07	0.68	0.54	0.54
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	360	322	126	2390	1923	860
v/s Ratio Prot	c0.13		0.03	c0.39	c0.35	
v/s Ratio Perm		0.01				0.09
v/c Ratio	0.62	0.05	0.47	0.57	0.64	0.16
Uniform Delay, d1	23.9	21.1	29.4	5.7	10.5	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	0.1	2.7	0.3	0.7	0.1
Delay (s)	27.3	21.2	32.1	6.0	11.2	7.6
Level of Service	C	C	C	A	B	A
Approach Delay (s)	25.6			7.1	10.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1705	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1705	1583
Volume (vph)	56	765	91	41	823	1031	33	106	7	896	128	95
Peak-hour factor, PHF	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. Flow (vph)	56	765	91	41	823	1031	33	106	7	896	128	95
RTOR Reduction (vph)	0	0	62	0	0	0	0	0	6	0	0	60
Lane Group Flow (vph)	56	765	29	41	823	1031	33	106	1	499	525	35
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	3.5	24.1	24.1	2.0	22.6	75.6	5.5	5.5	5.5	28.0	28.0	28.0
Effective Green, g (s)	3.5	24.1	24.1	2.0	22.6	75.6	5.5	5.5	5.5	28.0	28.0	28.0
Actuated g/C Ratio	0.05	0.32	0.32	0.03	0.30	1.00	0.07	0.07	0.07	0.37	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	82	1128	505	47	1058	1583	129	136	115	623	631	586
v/s Ratio Prot	0.03	0.22		0.02	c0.23		0.02	0.06		0.30	c0.31	
v/s Ratio Perm			0.02			c0.65			0.00			0.02
v/c Ratio	0.68	0.68	0.06	0.87	0.78	0.65	0.26	0.78	0.00	0.80	0.83	0.06
Uniform Delay, d1	35.5	22.4	17.9	36.7	24.2	0.0	33.1	34.5	32.5	21.3	21.7	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.9	1.6	0.0	84.1	3.7	2.1	1.1	24.0	0.0	7.3	9.2	0.0
Delay (s)	56.4	24.0	17.9	120.8	27.9	2.1	34.2	58.5	32.5	28.6	30.8	15.4
Level of Service	E	C	B	F	C	A	C	E	C	C	C	B
Approach Delay (s)		25.4			15.9			51.7			28.5	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1706	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1706	1583
Volume (vph)	50	719	43	73	784	784	43	60	13	876	130	78
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	51	734	44	74	800	800	44	61	13	894	133	80
RTOR Reduction (vph)	0	0	32	0	0	0	0	0	12	0	0	49
Lane Group Flow (vph)	51	734	12	74	800	800	44	61	1	500	527	31
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	2.8	20.1	20.1	4.8	22.1	73.0	4.2	4.2	4.2	27.9	27.9	27.9
Effective Green, g (s)	2.8	20.1	20.1	4.8	22.1	73.0	4.2	4.2	4.2	27.9	27.9	27.9
Actuated g/C Ratio	0.04	0.28	0.28	0.07	0.30	1.00	0.06	0.06	0.06	0.38	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	68	974	436	116	1071	1583	102	107	91	642	652	605
v/s Ratio Prot	0.03	0.21		0.04	c0.23		0.02	0.03		0.30	c0.31	
v/s Ratio Perm			0.01			c0.51			0.00			0.02
v/c Ratio	0.75	0.75	0.03	0.64	0.75	0.51	0.43	0.57	0.01	0.78	0.81	0.05
Uniform Delay, d1	34.8	24.2	19.3	33.3	22.9	0.0	33.2	33.5	32.4	19.8	20.2	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.6	3.3	0.0	11.0	2.9	1.2	2.9	7.1	0.0	5.9	7.3	0.0
Delay (s)	71.3	27.5	19.3	44.2	25.8	1.2	36.2	40.7	32.5	25.8	27.5	14.2
Level of Service	E	C	B	D	C	A	D	D	C	C	C	B
Approach Delay (s)		29.8			14.8			38.1			25.7	
Approach LOS		C			B			D			C	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	73.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Volume (vph)	65	1055	124	73	662	1177	62	147	36	951	162	148
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	66	1066	125	74	669	1189	63	148	36	961	164	149
RTOR Reduction (vph)	0	0	88	0	0	0	0	0	31	0	0	99
Lane Group Flow (vph)	66	1066	37	74	669	1189	63	148	5	548	577	50
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	4.7	25.8	25.8	4.0	25.1	86.6	11.8	11.8	11.8	29.0	29.0	29.0
Effective Green, g (s)	4.7	25.8	25.8	4.0	25.1	86.6	11.8	11.8	11.8	29.0	29.0	29.0
Actuated g/C Ratio	0.05	0.30	0.30	0.05	0.29	1.00	0.14	0.14	0.14	0.33	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	96	1054	472	82	1026	1583	241	254	216	563	572	530
v/s Ratio Prot	0.04	c0.30		0.04	0.19		0.04	0.08		0.33	c0.34	
v/s Ratio Perm			0.02			c0.75			0.00			0.03
v/c Ratio	0.69	1.01	0.08	0.90	0.65	0.75	0.26	0.58	0.02	0.97	1.01	0.09
Uniform Delay, d1	40.2	30.4	21.9	41.1	26.9	0.0	33.5	35.1	32.4	28.4	28.8	19.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.5	30.6	0.1	67.3	1.5	3.3	0.6	3.4	0.0	31.0	39.8	0.1
Delay (s)	58.7	61.0	21.9	108.4	28.4	3.3	34.1	38.5	32.4	59.4	68.6	19.9
Level of Service	E	E	C	F	C	A	C	D	C	E	E	B
Approach Delay (s)		57.0			16.0			36.5			59.0	
Approach LOS		E			B			D			E	

Intersection Summary			
HCM Average Control Delay	39.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	86.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95			1.00	1.00
Frt	1.00	0.95		1.00	1.00		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96			0.97	1.00
Satd. Flow (prot)	1770	4823		1770	5075		1681	1670			1812	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96			0.97	1.00
Satd. Flow (perm)	1770	4823		1770	5075		1681	1670			1812	1583
Volume (vph)	39	1108	581	59	1328	19	483	22	33	24	19	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	40	1131	593	60	1355	19	493	22	34	24	19	23
RTOR Reduction (vph)	0	97	0	0	2	0	0	6	0	0	0	22
Lane Group Flow (vph)	40	1627	0	60	1372	0	279	264	0	0	43	1
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												2
Actuated Green, G (s)	2.8	33.0		3.2	33.4		16.2	16.2			2.3	2.3
Effective Green, g (s)	2.8	33.0		3.2	33.4		16.2	16.2			2.3	2.3
Actuated g/C Ratio	0.04	0.47		0.05	0.47		0.23	0.23			0.03	0.03
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	70	2251		80	2398		385	383			59	51
v/s Ratio Prot	0.02	c0.34		c0.03	0.27		c0.17	0.16			c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.57	0.72		0.75	0.57		0.72	0.69			0.73	0.01
Uniform Delay, d1	33.4	15.2		33.4	13.5		25.2	24.9			33.9	33.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.8	1.2		32.0	0.3		6.6	5.1			36.0	0.1
Delay (s)	44.1	16.3		65.4	13.8		31.8	30.0			69.9	33.2
Level of Service	D	B		E	B		C	C			E	C
Approach Delay (s)		17.0			16.0			30.9			57.1	
Approach LOS		B			B			C			E	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95			1.00	1.00
Frt	1.00	0.94		1.00	0.99		1.00	0.97			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (prot)	1770	4788		1770	5010		1681	1679			1808	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98			0.97	1.00
Satd. Flow (perm)	1770	4788		1770	5010		1681	1679			1808	1583
Volume (vph)	224	806	514	70	1261	137	442	120	68	142	91	179
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	238	857	547	74	1341	146	470	128	72	151	97	190
RTOR Reduction (vph)	0	123	0	0	14	0	0	11	0	0	0	162
Lane Group Flow (vph)	238	1281	0	74	1473	0	331	328	0	0	248	28
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												2
Actuated Green, G (s)	13.0	36.1		4.7	27.8		19.9	19.9			13.0	13.0
Effective Green, g (s)	13.0	36.1		4.7	27.8		19.9	19.9			13.0	13.0
Actuated g/C Ratio	0.14	0.40		0.05	0.31		0.22	0.22			0.14	0.14
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	257	1927		93	1553		373	372			262	229
v/s Ratio Prot	c0.13	0.27		0.04	c0.29		c0.20	0.20			c0.14	
v/s Ratio Perm												0.02
v/c Ratio	0.93	0.66		0.80	0.95		0.89	0.88			0.95	0.12
Uniform Delay, d1	37.9	21.9		42.0	30.2		33.8	33.8			38.0	33.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	36.5	0.9		36.1	12.5		21.6	21.0			40.8	0.2
Delay (s)	74.4	22.7		78.1	42.7		55.4	54.7			78.8	33.6
Level of Service	E	C		E	D		E	D			E	C
Approach Delay (s)		30.2			44.4			55.0			59.2	
Approach LOS		C			D			E			E	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	89.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95			1.00	1.00
Frt	1.00	0.95		1.00	1.00		1.00	0.98			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96			0.98	1.00
Satd. Flow (prot)	1770	4845		1770	5080		1681	1667			1817	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96			0.98	1.00
Satd. Flow (perm)	1770	4845		1770	5080		1681	1667			1817	1583
Volume (vph)	24	1374	630	38	1136	8	793	10	47	28	28	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	24	1402	643	39	1159	8	809	10	48	29	29	21
RTOR Reduction (vph)	0	88	0	0	1	0	0	6	0	0	0	20
Lane Group Flow (vph)	24	1957	0	39	1166	0	449	412	0	0	58	1
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												2
Actuated Green, G (s)	1.7	36.7		2.1	37.1		24.0	24.0			2.9	2.9
Effective Green, g (s)	1.7	36.7		2.1	37.1		24.0	24.0			2.9	2.9
Actuated g/C Ratio	0.02	0.45		0.03	0.45		0.29	0.29			0.04	0.04
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	37	2176		45	2307		494	490			64	56
v/s Ratio Prot	0.01	c0.40		c0.02	0.23		c0.27	0.25			c0.03	
v/s Ratio Perm												0.00
v/c Ratio	0.65	0.90		0.87	0.51		0.91	0.84			0.91	0.01
Uniform Delay, d1	39.7	20.8		39.7	15.8		27.8	27.1			39.3	38.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	33.0	5.4		84.0	0.2		20.4	12.4			79.3	0.1
Delay (s)	72.7	26.2		123.7	16.0		48.2	39.4			118.6	38.1
Level of Service	E	C		F	B		D	D			F	D
Approach Delay (s)		26.8			19.5			44.0			97.2	
Approach LOS		C			B			D			F	

Intersection Summary			
HCM Average Control Delay	29.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3456	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3456	
Volume (vph)	54	337	179	95	277	96	167	464	115	102	437	81
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	355	188	100	292	101	176	488	121	107	460	85
RTOR Reduction (vph)	0	0	140	0	0	71	0	0	79	0	15	0
Lane Group Flow (vph)	57	355	48	100	292	30	176	488	42	107	530	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.6	19.5	19.5	7.1	23.0	23.0	9.9	26.3	26.3	7.5	23.9	
Effective Green, g (s)	3.6	19.5	19.5	7.1	23.0	23.0	9.9	26.3	26.3	7.5	23.9	
Actuated g/C Ratio	0.05	0.26	0.26	0.09	0.30	0.30	0.13	0.34	0.34	0.10	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	83	476	404	164	561	477	229	1218	545	174	1081	
v/s Ratio Prot	0.03	c0.19		c0.06	c0.16		c0.10	0.14		0.06	c0.15	
v/s Ratio Perm			0.03			0.02			0.03			
v/c Ratio	0.69	0.75	0.12	0.61	0.52	0.06	0.77	0.40	0.08	0.61	0.49	
Uniform Delay, d1	35.8	26.2	21.9	33.3	22.1	19.0	32.1	19.1	16.9	33.1	21.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.0	6.3	0.1	6.3	0.9	0.1	14.3	1.0	0.3	6.3	1.6	
Delay (s)	56.9	32.4	22.0	39.6	23.0	19.1	46.5	20.0	17.1	39.4	22.9	
Level of Service	E	C	C	D	C	B	D	C	B	D	C	
Approach Delay (s)		31.5			25.6			25.5			25.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	20.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Volume (vph)	74	248	159	83	254	142	135	522	84	107	558	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	75	251	161	84	257	143	136	527	85	108	564	69
RTOR Reduction (vph)	0	0	130	0	0	115	0	0	51	0	9	0
Lane Group Flow (vph)	75	251	31	84	257	28	136	527	34	108	624	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.8	14.7	14.7	7.0	14.9	14.9	8.9	30.5	30.5	8.1	29.7	
Effective Green, g (s)	6.8	14.7	14.7	7.0	14.9	14.9	8.9	30.5	30.5	8.1	29.7	
Actuated g/C Ratio	0.09	0.19	0.19	0.09	0.20	0.20	0.12	0.40	0.40	0.11	0.39	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	158	359	305	162	364	309	206	1415	633	188	1355	
v/s Ratio Prot	0.04	0.13		c0.05	c0.14		c0.08	0.15		0.06	c0.18	
v/s Ratio Perm			0.02			0.02			0.02			
v/c Ratio	0.47	0.70	0.10	0.52	0.71	0.09	0.66	0.37	0.05	0.57	0.46	
Uniform Delay, d1	33.1	28.7	25.4	33.0	28.7	25.1	32.3	16.2	14.0	32.5	17.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	5.9	0.1	2.8	6.1	0.1	7.7	0.8	0.2	4.2	1.1	
Delay (s)	35.3	34.6	25.5	35.8	34.8	25.3	39.9	16.9	14.2	36.7	18.5	
Level of Service	D	C	C	D	C	C	D	B	B	D	B	
Approach Delay (s)		31.7			32.2			20.8			21.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3419	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3419	
Volume (vph)	129	454	146	37	333	216	124	427	102	182	498	147
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	130	459	147	37	336	218	125	431	103	184	503	148
RTOR Reduction (vph)	0	0	100	0	0	164	0	0	71	0	28	0
Lane Group Flow (vph)	130	459	47	37	336	54	125	431	32	184	623	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	8.1	25.2	25.2	2.6	19.7	19.7	7.6	25.0	25.0	10.6	28.0	
Effective Green, g (s)	8.1	25.2	25.2	2.6	19.7	19.7	7.6	25.0	25.0	10.6	28.0	
Actuated g/C Ratio	0.10	0.32	0.32	0.03	0.25	0.25	0.10	0.31	0.31	0.13	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	181	591	502	58	462	393	169	1114	498	236	1206	
v/s Ratio Prot	c0.07	c0.25		0.02	0.18		0.07	0.12		c0.10	c0.18	
v/s Ratio Perm			0.03			0.03			0.02			
v/c Ratio	0.72	0.78	0.09	0.64	0.73	0.14	0.74	0.39	0.07	0.78	0.52	
Uniform Delay, d1	34.5	24.6	19.1	37.9	27.4	23.2	34.9	21.2	19.0	33.3	20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.8	6.4	0.1	20.8	5.6	0.2	15.5	1.0	0.3	15.0	1.6	
Delay (s)	47.3	30.9	19.1	58.7	33.0	23.4	50.5	22.2	19.3	48.2	21.9	
Level of Service	D	C	B	E	C	C	D	C	B	D	C	
Approach Delay (s)		31.5			31.1			27.1			27.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	117	533	147	239	534	187	160	691	482	301	583	102
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	123	561	155	252	562	197	168	727	507	317	614	107
RTOR Reduction (vph)	0	0	123	0	0	151	0	0	219	0	0	67
Lane Group Flow (vph)	123	561	32	252	562	46	168	727	288	317	614	40
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.7	17.4	17.4	8.8	19.5	19.5	10.4	23.5	23.5	17.9	31.0	31.0
Effective Green, g (s)	6.7	17.4	17.4	8.8	19.5	19.5	10.4	23.5	23.5	17.9	31.0	31.0
Actuated g/C Ratio	0.08	0.21	0.21	0.11	0.23	0.23	0.12	0.28	0.28	0.21	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	142	737	329	361	825	369	220	995	445	379	1312	587
v/s Ratio Prot	c0.07	0.16		0.07	c0.16		0.09	c0.21		c0.18	0.17	
v/s Ratio Perm			0.02			0.03			0.18			0.03
v/c Ratio	0.87	0.76	0.10	0.70	0.68	0.12	0.76	0.73	0.65	0.84	0.47	0.07
Uniform Delay, d1	38.0	31.1	26.8	36.1	29.2	25.3	35.4	27.2	26.4	31.4	20.0	17.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.7	4.7	0.1	5.8	2.3	0.2	14.5	2.8	3.2	14.7	0.3	0.0
Delay (s)	76.8	35.8	26.9	41.9	31.5	25.5	49.9	30.0	29.7	46.2	20.3	17.0
Level of Service	E	D	C	D	C	C	D	C	C	D	C	B
Approach Delay (s)		40.2			32.9			32.3			27.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	113	539	126	179	520	154	96	686	475	332	665	104
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	115	550	129	183	531	157	98	700	485	339	679	106
RTOR Reduction (vph)	0	0	101	0	0	122	0	0	195	0	0	62
Lane Group Flow (vph)	115	550	28	183	531	35	98	700	290	339	679	44
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	6.7	17.9	17.9	7.0	18.2	18.2	7.1	23.1	23.1	18.6	34.6	34.6
Effective Green, g (s)	6.7	17.9	17.9	7.0	18.2	18.2	7.1	23.1	23.1	18.6	34.6	34.6
Actuated g/C Ratio	0.08	0.22	0.22	0.08	0.22	0.22	0.09	0.28	0.28	0.23	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	144	767	343	291	780	349	152	990	443	399	1482	663
v/s Ratio Prot	c0.06	c0.16		0.05	0.15		0.06	c0.20		c0.19	0.19	
v/s Ratio Perm			0.02			0.02			0.18			0.03
v/c Ratio	0.80	0.72	0.08	0.63	0.68	0.10	0.64	0.71	0.65	0.85	0.46	0.07
Uniform Delay, d1	37.3	30.0	25.8	36.5	29.5	25.7	36.5	26.7	26.2	30.7	17.3	14.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.7	3.2	0.1	4.2	2.5	0.1	9.0	2.3	3.5	15.4	0.2	0.0
Delay (s)	63.0	33.2	25.9	40.8	32.0	25.8	45.6	29.0	29.7	46.1	17.5	14.4
Level of Service	E	C	C	D	C	C	D	C	C	D	B	B
Approach Delay (s)		36.3			32.7			30.5			25.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	82.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	137	552	58	652	622	182	103	646	401	433	417	125
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	600	63	709	676	198	112	702	436	471	453	136
RTOR Reduction (vph)	0	0	53	0	0	149	0	0	284	0	0	87
Lane Group Flow (vph)	149	600	10	709	676	49	112	702	152	471	453	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.4	15.0	15.0	18.0	22.6	22.6	8.8	18.8	18.8	23.0	33.0	33.0
Effective Green, g (s)	10.4	15.0	15.0	18.0	22.6	22.6	8.8	18.8	18.8	23.0	33.0	33.0
Actuated g/C Ratio	0.11	0.17	0.17	0.20	0.25	0.25	0.10	0.21	0.21	0.25	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	203	585	262	681	881	394	172	733	328	448	1286	575
v/s Ratio Prot	0.08	c0.17		c0.21	0.19		0.06	c0.20		c0.27	0.13	
v/s Ratio Perm			0.01			0.03			0.10			0.03
v/c Ratio	0.73	1.03	0.04	1.04	0.77	0.13	0.65	0.96	0.46	1.05	0.35	0.09
Uniform Delay, d1	38.9	37.9	31.8	36.4	31.7	26.4	39.5	35.6	31.6	33.9	21.1	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.9	43.9	0.1	45.6	4.0	0.1	8.5	23.1	1.0	56.7	0.2	0.1
Delay (s)	51.7	81.8	31.9	82.0	35.7	26.6	48.0	58.7	32.6	90.6	21.3	19.1
Level of Service	D	F	C	F	D	C	D	E	C	F	C	B
Approach Delay (s)		72.4			55.3			48.7			51.8	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	55.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4972		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4972		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	77	565	99	553	1227	183	147	483	491	175	538	95
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	79	577	101	564	1252	187	150	493	501	179	549	97
RTOR Reduction (vph)	0	26	0	0	0	106	0	0	58	0	0	77
Lane Group Flow (vph)	79	652	0	564	1252	81	150	493	443	179	549	20
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	4.2	19.7		18.8	34.3	34.3	8.2	15.7	34.5	9.0	16.5	16.5
Effective Green, g (s)	4.2	19.7		18.8	34.3	34.3	8.2	15.7	34.5	9.0	16.5	16.5
Actuated g/C Ratio	0.05	0.25		0.24	0.43	0.43	0.10	0.20	0.44	0.11	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	1237		815	1533	686	183	702	770	201	737	330
v/s Ratio Prot	0.04	0.13		0.16	c0.35		0.08	0.14	c0.14	c0.10	c0.16	
v/s Ratio Perm						0.05			0.14			0.01
v/c Ratio	0.84	0.53		0.69	0.82	0.12	0.82	0.70	0.58	0.89	0.74	0.06
Uniform Delay, d1	37.2	25.7		27.6	19.7	13.4	34.8	29.6	16.8	34.6	29.4	25.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.8	0.4		2.6	3.5	0.1	24.0	3.2	1.0	35.1	4.1	0.1
Delay (s)	83.0	26.1		30.1	23.2	13.5	58.8	32.8	17.9	69.7	33.5	25.2
Level of Service	F	C		C	C	B	E	C	B	E	C	C
Approach Delay (s)		32.1			24.2			29.7			40.4	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4994		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4994		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	46	596	81	455	978	115	89	505	415	99	446	57
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	627	85	479	1029	121	94	532	437	104	469	60
RTOR Reduction (vph)	0	19	0	0	0	69	0	0	78	0	0	47
Lane Group Flow (vph)	48	693	0	479	1029	52	94	532	359	104	469	13
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	3.0	19.0		15.3	31.3	31.3	6.6	16.1	31.4	7.0	16.5	16.5
Effective Green, g (s)	3.0	19.0		15.3	31.3	31.3	6.6	16.1	31.4	7.0	16.5	16.5
Actuated g/C Ratio	0.04	0.26		0.21	0.43	0.43	0.09	0.22	0.43	0.10	0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	72	1293		716	1509	675	159	776	763	169	796	356
v/s Ratio Prot	0.03	0.14		c0.14	c0.29		0.05	c0.15	c0.10	c0.06	0.13	
v/s Ratio Perm						0.03			0.13			0.01
v/c Ratio	0.67	0.54		0.67	0.68	0.08	0.59	0.69	0.47	0.62	0.59	0.04
Uniform Delay, d1	34.7	23.4		26.7	17.0	12.5	32.1	26.3	15.0	31.9	25.4	22.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.9	0.4		2.4	1.3	0.0	5.8	2.5	0.5	6.5	1.1	0.0
Delay (s)	55.6	23.8		29.1	18.3	12.5	37.9	28.8	15.5	38.4	26.5	22.3
Level of Service	E	C		C	B	B	D	C	B	D	C	C
Approach Delay (s)		25.8			21.1			24.2			28.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4982		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4982		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	111	1192	187	440	795	138	112	553	668	105	582	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	112	1204	189	444	803	139	113	559	675	106	588	69
RTOR Reduction (vph)	0	23	0	0	0	79	0	0	23	0	0	54
Lane Group Flow (vph)	112	1370	0	444	803	60	113	559	652	106	588	15
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	8.4	27.2		18.8	37.6	37.6	7.1	20.2	39.0	5.3	18.4	18.4
Effective Green, g (s)	8.4	27.2		18.8	37.6	37.6	7.1	20.2	39.0	5.3	18.4	18.4
Actuated g/C Ratio	0.10	0.31		0.21	0.43	0.43	0.08	0.23	0.45	0.06	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	170	1549		738	1521	680	144	817	778	107	744	333
v/s Ratio Prot	0.06	c0.27		0.13	0.23		c0.06	0.16	c0.18	0.06	0.17	
v/s Ratio Perm						0.04			0.23			0.01
v/c Ratio	0.66	0.88		0.60	0.53	0.09	0.78	0.68	0.84	0.99	0.79	0.04
Uniform Delay, d1	38.2	28.7		31.0	18.4	14.8	39.5	30.7	21.5	41.1	32.7	27.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.9	6.4		1.4	0.3	0.1	23.8	2.4	7.9	83.8	5.7	0.1
Delay (s)	47.1	35.0		32.4	18.7	14.8	63.3	33.1	29.3	124.9	38.4	27.6
Level of Service	D	D		C	B	B	E	C	C	F	D	C
Approach Delay (s)		35.9			22.7			33.8			49.5	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	87.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	409	745	1471	0	0	347
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	445	810	1599	0	0	377
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1599				2893	799
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1599				2893	799
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	0
cM capacity (veh/h)	406				0	328

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	445	405	405	799	799	377
Volume Left	445	0	0	0	0	0
Volume Right	0	0	0	0	0	377
cSH	406	1700	1700	1700	1700	328
Volume to Capacity	1.10	0.24	0.24	0.47	0.47	1.15
Queue Length 95th (ft)	389	0	0	0	0	384
Control Delay (s)	105.1	0.0	0.0	0.0	0.0	132.0
Lane LOS	F					F
Approach Delay (s)	37.3			0.0		132.0
Approach LOS						F

Intersection Summary			
Average Delay	29.9		
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	523	1429	985	0	0	436
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	539	1473	1015	0	0	449
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1015				2830	508
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1015				2830	508
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	21				100	12
cM capacity (veh/h)	679				3	510

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	539	737	737	508	508	449
Volume Left	539	0	0	0	0	0
Volume Right	0	0	0	0	0	449
cSH	679	1700	1700	1700	1700	510
Volume to Capacity	0.79	0.43	0.43	0.30	0.30	0.88
Queue Length 95th (ft)	199	0	0	0	0	243
Control Delay (s)	27.6	0.0	0.0	0.0	0.0	44.5
Lane LOS	D					E
Approach Delay (s)	7.4			0.0		44.5
Approach LOS						E

Intersection Summary			
Average Delay	10.0		
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	450	853	1197	0	0	287
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	455	862	1209	0	0	290
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1209				2549	605
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1209				2549	605
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	21				100	34
cM capacity (veh/h)	573				5	441

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	455	431	431	605	605	290
Volume Left	455	0	0	0	0	0
Volume Right	0	0	0	0	0	290
cSH	573	1700	1700	1700	1700	441
Volume to Capacity	0.79	0.25	0.25	0.36	0.36	0.66
Queue Length 95th (ft)	190	0	0	0	0	116
Control Delay (s)	31.2	0.0	0.0	0.0	0.0	27.5
Lane LOS	D					D
Approach Delay (s)	10.8			0.0		27.5
Approach LOS						D

Intersection Summary			
Average Delay	7.9		
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3510		3433	3539	1583		1826	1583		2909	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3510		3433	3539	1583		1826	1583		2909	1346
Volume (vph)	0	856	50	271	1248	159	91	138	213	135	62	18
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	892	52	282	1300	166	95	144	222	141	65	19
RTOR Reduction (vph)	0	5	0	0	0	68	0	0	179	0	0	17
Lane Group Flow (vph)	0	939	0	282	1300	98	0	239	43	0	206	2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		Prot	Split		Perm
Protected Phases		4		3	8		6	6	6	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		25.4		10.0	39.4	39.4		14.6	14.6		9.1	9.1
Effective Green, g (s)		25.4		10.0	39.4	39.4		14.6	14.6		9.1	9.1
Actuated g/C Ratio		0.34		0.13	0.52	0.52		0.19	0.19		0.12	0.12
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1187		457	1857	830		355	308		352	163
v/s Ratio Prot		c0.27		0.08	c0.37			c0.13	0.03		c0.07	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.79		0.62	0.70	0.12		0.67	0.14		0.59	0.01
Uniform Delay, d1		22.5		30.7	13.4	9.0		28.0	25.1		31.2	29.1
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.7		2.5	1.2	0.1		5.0	0.2		2.5	0.0
Delay (s)		26.1		33.2	14.6	9.1		33.0	25.3		33.7	29.1
Level of Service		C		C	B	A		C	C		C	C
Approach Delay (s)		26.1			17.1			29.3			33.3	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	75.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3514		3433	3539	1583		1833	1583		3072	1417
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3514		3433	3539	1583		1833	1583		3072	1417
Volume (vph)	0	868	44	265	1141	166	55	115	260	166	103	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	904	46	276	1189	173	57	120	271	173	107	31
RTOR Reduction (vph)	0	4	0	0	0	82	0	0	226	0	0	26
Lane Group Flow (vph)	0	946	0	276	1189	91	0	177	45	0	280	5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	14%	14%	14%
Turn Type				Prot		Perm	Split		Prot	Split		Perm
Protected Phases		4		3	8		6	6	6	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		25.6		9.9	39.5	39.5		12.3	12.3		11.1	11.1
Effective Green, g (s)		25.6		9.9	39.5	39.5		12.3	12.3		11.1	11.1
Actuated g/C Ratio		0.34		0.13	0.53	0.53		0.16	0.16		0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1201		454	1866	835		301	260		455	210
v/s Ratio Prot		c0.27		0.08	c0.34			c0.10	0.03		c0.09	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.79		0.61	0.64	0.11		0.59	0.17		0.62	0.02
Uniform Delay, d1		22.2		30.7	12.6	8.9		29.0	26.9		29.9	27.3
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		3.5		2.3	0.7	0.1		2.9	0.3		2.5	0.0
Delay (s)		25.7		33.0	13.3	8.9		31.9	27.2		32.4	27.3
Level of Service		C		C	B	A		C	C		C	C
Approach Delay (s)		25.7			16.2			29.1			31.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3514		3433	3539	1583		1832	1583		3185	1468
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3514		3433	3539	1583		1832	1583		3185	1468
Volume (vph)	0	1308	66	335	943	172	84	169	458	206	133	32
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1335	67	342	962	176	86	172	467	210	136	33
RTOR Reduction (vph)	0	4	0	0	0	76	0	0	19	0	0	29
Lane Group Flow (vph)	0	1398	0	342	962	100	0	258	448	0	346	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	10%	10%	10%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		37.0		10.0	51.0	51.0		17.0	31.0		10.0	10.0
Effective Green, g (s)		37.0		10.0	51.0	51.0		17.0	31.0		10.0	10.0
Actuated g/C Ratio		0.41		0.11	0.57	0.57		0.19	0.34		0.11	0.11
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1445		381	2005	897		346	545		354	163
v/s Ratio Prot		c0.40		0.10	0.27			0.14	c0.28		c0.11	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.97		0.90	0.48	0.11		0.75	0.82		1.15dl	0.02
Uniform Delay, d1		25.9		39.5	11.6	9.0		34.5	27.0		39.9	35.6
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		16.4		22.8	0.2	0.1		8.5	9.7		41.3	0.1
Delay (s)		42.3		62.3	11.8	9.1		42.9	36.7		81.2	35.7
Level of Service		D		E	B	A		D	D		F	D
Approach Delay (s)		42.3			23.1			38.9			77.3	
Approach LOS		D			C			D			E	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.0%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	163	870	1293	10	0	130
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	166	888	1319	10	0	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.73				0.75	0.73
vC, conflicting volume	1330				2101	665
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1081				1986	169
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	64				100	78
cM capacity (veh/h)	468				26	617

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	166	444	444	880	450	133
Volume Left	166	0	0	0	0	0
Volume Right	0	0	0	0	10	133
cSH	468	1700	1700	1700	1700	617
Volume to Capacity	0.36	0.26	0.26	0.52	0.26	0.22
Queue Length 95th (ft)	40	0	0	0	0	20
Control Delay (s)	16.9	0.0	0.0	0.0	0.0	12.4
Lane LOS	C					B
Approach Delay (s)	2.7			0.0		12.4
Approach LOS						B

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	152	952	1213	14	0	137
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	160	1002	1277	15	0	144
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		660	984			
pX, platoon unblocked	0.75				0.79	0.75
vC, conflicting volume	1292				2105	646
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1061				1868	206
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	67				100	76
cM capacity (veh/h)	492				34	604

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	160	501	501	851	440	144
Volume Left	160	0	0	0	0	0
Volume Right	0	0	0	0	15	144
cSH	492	1700	1700	1700	1700	604
Volume to Capacity	0.33	0.29	0.29	0.50	0.26	0.24
Queue Length 95th (ft)	35	0	0	0	0	23
Control Delay (s)	15.8	0.0	0.0	0.0	0.0	12.8
Lane LOS	C					B
Approach Delay (s)	2.2			0.0		12.8
Approach LOS						B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	103	1356	1115	8	0	155
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	104	1370	1126	8	0	157
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		657	984			
pX, platoon unblocked	0.85				0.84	0.85
vC, conflicting volume	1134				2023	567
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	986				1502	321
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	82				100	73
cM capacity (veh/h)	595				78	576

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	104	685	685	751	384	157
Volume Left	104	0	0	0	0	0
Volume Right	0	0	0	0	8	157
cSH	595	1700	1700	1700	1700	576
Volume to Capacity	0.18	0.40	0.40	0.44	0.23	0.27
Queue Length 95th (ft)	16	0	0	0	0	27
Control Delay (s)	12.3	0.0	0.0	0.0	0.0	13.6
Lane LOS	B					B
Approach Delay (s)	0.9			0.0		13.6
Approach LOS						B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	133	40	24	267	193	98
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	156	47	28	314	227	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	598	227	342			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	598	227	342			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	94	98			
cM capacity (veh/h)	455	812	1217			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	156	47	342	227	115
Volume Left	156	0	28	0	0
Volume Right	0	47	0	0	115
cSH	455	812	1217	1700	1700
Volume to Capacity	0.34	0.06	0.02	0.13	0.07
Queue Length 95th (ft)	38	5	2	0	0
Control Delay (s)	17.0	9.7	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	15.3		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.8		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	140	26	23	281	229	118
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	165	31	27	331	269	139
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	654	269	408			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	654	269	408			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	61	96	98			
cM capacity (veh/h)	421	769	1151			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	165	31	358	269	139
Volume Left	165	0	27	0	0
Volume Right	0	31	0	0	139
cSH	421	769	1151	1700	1700
Volume to Capacity	0.39	0.04	0.02	0.16	0.08
Queue Length 95th (ft)	46	3	2	0	0
Control Delay (s)	18.9	9.9	0.8	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	17.5		0.8	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	82	29	44	307	333	162
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	102	36	55	384	416	202
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	910	416	619			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910	416	619			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	94	94			
cM capacity (veh/h)	287	636	962			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	102	36	439	416	202
Volume Left	102	0	55	0	0
Volume Right	0	36	0	0	202
cSH	287	636	962	1700	1700
Volume to Capacity	0.36	0.06	0.06	0.24	0.12
Queue Length 95th (ft)	39	5	5	0	0
Control Delay (s)	24.3	11.0	1.7	0.0	0.0
Lane LOS	C	B	A		
Approach Delay (s)	20.8		1.7	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	6	146	0	18	4	179	182	24	172	2
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	7	172	0	21	4	211	214	28	202	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	500	693	203	593	587	318	205			425		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	500	693	203	593	587	318	205			425		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	58	100	97	100			98		
cM capacity (veh/h)	457	356	837	405	410	723	1367			1135		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	8	193	4	425	233
Volume Left	1	172	4	0	28
Volume Right	7	21	0	214	2
cSH	748	426	1367	1700	1135
Volume to Capacity	0.01	0.45	0.00	0.25	0.02
Queue Length 95th (ft)	1	58	0	0	2
Control Delay (s)	9.9	20.3	7.6	0.0	1.2
Lane LOS	A	C	A		A
Approach Delay (s)	9.9	20.3	0.1		1.2
Approach LOS	A	C			

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	11	157	0	23	5	180	228	29	177	1
Peak Hour Factor	0.92	0.92	0.92	0.86	0.92	0.86	0.92	0.86	0.86	0.86	0.86	0.92
Hourly flow rate (vph)	1	0	12	183	0	27	5	209	265	34	206	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	520	759	206	638	627	342	207			474		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	520	759	206	638	627	342	207			474		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	51	100	96	100			97		
cM capacity (veh/h)	437	324	835	374	386	701	1364			1088		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	13	209	5	474	240	1
Volume Left	1	183	5	0	34	0
Volume Right	12	27	0	265	0	1
cSH	776	397	1364	1700	1088	1700
Volume to Capacity	0.02	0.53	0.00	0.28	0.03	0.00
Queue Length 95th (ft)	1	74	0	0	2	0
Control Delay (s)	9.7	23.7	7.6	0.0	1.4	0.0
Lane LOS	A	C	A		A	
Approach Delay (s)	9.7	23.7	0.1		1.4	
Approach LOS	A	C				

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	2	6	232	0	16	6	199	226	24	253	3
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	0	2	7	261	0	18	7	224	254	27	284	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	593	829	284	709	705	351	288			478		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	593	829	284	709	705	351	288			478		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	22	100	97	99			98		
cM capacity (veh/h)	397	297	755	336	350	693	1274			1085		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	9	279	7	478	311	3
Volume Left	0	261	7	0	27	0
Volume Right	7	18	0	254	0	3
cSH	545	348	1274	1700	1085	1700
Volume to Capacity	0.02	0.80	0.01	0.28	0.02	0.00
Queue Length 95th (ft)	1	170	0	0	2	0
Control Delay (s)	11.7	46.4	7.8	0.0	1.0	0.0
Lane LOS	B	E	A		A	
Approach Delay (s)	11.7	46.4	0.1		0.9	
Approach LOS	B	E				

Intersection Summary			
Average Delay	12.3		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5073		1770	1623			1779	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		1.00	1.00			1.00	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5073		1863	1623			1859	1583
Volume (vph)	38	1029	75	59	1322	23	46	4	24	34	2	32
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	39	1050	77	60	1349	23	47	4	24	35	2	33
RTOR Reduction (vph)	0	0	23	0	1	0	0	23	0	0	0	31
Lane Group Flow (vph)	39	1050	54	60	1371	0	47	5	0	0	37	2
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.4	46.4	46.4	3.8	46.8		3.9	3.9			3.9	3.9
Effective Green, g (s)	3.4	46.4	46.4	3.8	46.8		3.9	3.9			3.9	3.9
Actuated g/C Ratio	0.05	0.70	0.70	0.06	0.71		0.06	0.06			0.06	0.06
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	91	2484	1111	102	3592		110	96			110	93
v/s Ratio Prot	0.02	c0.30		c0.03	0.27			0.00				
v/s Ratio Perm			0.03				c0.03				0.02	0.00
v/c Ratio	0.43	0.42	0.05	0.59	0.38		0.43	0.06			0.34	0.02
Uniform Delay, d1	30.4	4.2	3.0	30.4	3.9		30.0	29.4			29.9	29.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.2	0.1	0.0	8.4	0.1		2.7	0.2			1.8	0.1
Delay (s)	33.6	4.3	3.1	38.8	3.9		32.7	29.6			31.7	29.4
Level of Service	C	A	A	D	A		C	C			C	C
Approach Delay (s)		5.2			5.4			31.5			30.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	66.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5067		1770	1626			1776	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.69	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5067		1317	1626			1290	1583
Volume (vph)	45	880	91	72	1294	31	83	8	43	71	2	91
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	926	96	76	1362	33	87	8	45	75	2	96
RTOR Reduction (vph)	0	0	38	0	2	0	0	40	0	0	0	86
Lane Group Flow (vph)	47	926	58	76	1393	0	87	13	0	0	77	10
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.2	37.5	37.5	5.5	39.8		6.6	6.6			6.6	6.6
Effective Green, g (s)	3.2	37.5	37.5	5.5	39.8		6.6	6.6			6.6	6.6
Actuated g/C Ratio	0.05	0.61	0.61	0.09	0.65		0.11	0.11			0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	92	2154	964	158	3274		141	174			138	170
v/s Ratio Prot	0.03	0.26		c0.04	c0.27			0.01				
v/s Ratio Perm			0.04				c0.07				0.06	0.01
v/c Ratio	0.51	0.43	0.06	0.48	0.43		0.62	0.07			0.56	0.06
Uniform Delay, d1	28.4	6.4	4.9	26.7	5.3		26.3	24.7			26.1	24.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.7	0.1	0.0	2.3	0.1		7.8	0.2			4.8	0.1
Delay (s)	33.2	6.5	4.9	29.0	5.4		34.1	24.9			30.9	24.9
Level of Service	C	A	A	C	A		C	C			C	C
Approach Delay (s)		7.6			6.6			30.6			27.6	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	61.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5077		1770	1599			1792	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.76	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5077		1359	1599			1423	1583
Volume (vph)	26	1313	114	89	1034	12	128	4	66	32	9	34
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1340	116	91	1055	12	131	4	67	33	9	35
RTOR Reduction (vph)	0	0	45	0	1	0	0	57	0	0	0	30
Lane Group Flow (vph)	27	1340	71	91	1066	0	131	14	0	0	42	5
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	2.6	45.2	45.2	5.9	48.5		10.9	10.9			10.9	10.9
Effective Green, g (s)	2.6	45.2	45.2	5.9	48.5		10.9	10.9			10.9	10.9
Actuated g/C Ratio	0.04	0.61	0.61	0.08	0.66		0.15	0.15			0.15	0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	62	2162	967	141	3327		200	236			210	233
v/s Ratio Prot	0.02	c0.38		c0.05	c0.21			0.01				
v/s Ratio Perm			0.04				c0.10				0.03	0.00
v/c Ratio	0.44	0.62	0.07	0.65	0.32		0.66	0.06			0.20	0.02
Uniform Delay, d1	35.0	9.0	5.9	33.0	5.6		29.8	27.1			27.7	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.8	0.5	0.0	9.7	0.1		7.5	0.1			0.5	0.0
Delay (s)	39.8	9.6	5.9	42.8	5.6		37.3	27.2			28.2	27.0
Level of Service	D	A	A	D	A		D	C			C	C
Approach Delay (s)		9.8			8.5			33.7			27.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	735	10	82	1465	17	6	19	24	2	9	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	758	10	85	1510	18	6	21	25	2	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1529			768			1692	2461	384	2093	2447	755
vC1, stage 1 conf vol							763	763		1679	1679	
vC2, stage 2 conf vol							929	1698		414	768	
vCu, unblocked vol	1529			768			1692	2461	384	2093	2447	755
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			97	83	96	97	92	100
cM capacity (veh/h)	432			842			200	123	614	85	122	351

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	505	263	85	755	755	18	52	12
Volume Left	0	0	85	0	0	0	6	2
Volume Right	0	10	0	0	0	18	25	0
cSH	1700	1700	842	1700	1700	1700	216	113
Volume to Capacity	0.30	0.15	0.10	0.44	0.44	0.01	0.24	0.11
Queue Length 95th (ft)	0	0	8	0	0	0	23	9
Control Delay (s)	0.0	0.0	9.8	0.0	0.0	0.0	26.8	40.5
Lane LOS			A				D	E
Approach Delay (s)	0.0		0.5				26.8	40.5
Approach LOS							D	E

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	810	43	65	1194	23	3	23	38	2	14	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	835	44	67	1231	25	3	25	39	2	15	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1256			879			1614	2247	440	1834	2244	615
vC1, stage 1 conf vol							857	857		1365	1365	
vC2, stage 2 conf vol							757	1390		469	879	
vCu, unblocked vol	1256			879			1614	2247	440	1834	2244	615
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			91			99	85	93	98	91	100
cM capacity (veh/h)	550			764			223	167	565	132	162	434

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	557	323	67	615	615	25	67	17
Volume Left	0	0	67	0	0	0	3	2
Volume Right	0	44	0	0	0	25	39	0
cSH	1700	1700	764	1700	1700	1700	288	157
Volume to Capacity	0.33	0.19	0.09	0.36	0.36	0.01	0.23	0.11
Queue Length 95th (ft)	0	0	7	0	0	0	22	9
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	0.0	21.2	30.7
Lane LOS			B				C	D
Approach Delay (s)	0.0		0.5				21.2	30.7
Approach LOS							C	D

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1413	16	24	969	25	16	15	31	2	10	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1457	16	25	999	26	16	15	32	2	10	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1025			1473			2019	2539	737	1816	2522	499
vC1, stage 1 conf vol							1465	1465		1048	1048	
vC2, stage 2 conf vol							554	1074		768	1473	
vCu, unblocked vol	1025			1473			2019	2539	737	1816	2522	499
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			95			87	90	91	99	93	100
cM capacity (veh/h)	673			454			126	153	361	176	139	517

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	971	502	25	499	499	26	64	12
Volume Left	0	0	25	0	0	0	16	2
Volume Right	0	16	0	0	0	26	32	0
cSH	1700	1700	454	1700	1700	1700	200	144
Volume to Capacity	0.57	0.30	0.05	0.29	0.29	0.02	0.32	0.09
Queue Length 95th (ft)	0	0	4	0	0	0	33	7
Control Delay (s)	0.0	0.0	13.4	0.0	0.0	0.0	31.3	32.3
Lane LOS			B				D	D
Approach Delay (s)	0.0		0.3				31.3	32.3
Approach LOS							D	D

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	409	0	11	347	0	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	445	0	12	377	0	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			445		846	445
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			445		846	445
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	94
cM capacity (veh/h)			1116		329	613

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	445	12	377	39
Volume Left	0	12	0	0
Volume Right	0	0	0	39
cSH	1700	1116	1700	613
Volume to Capacity	0.26	0.01	0.22	0.06
Queue Length 95th (ft)	0	1	0	5
Control Delay (s)	0.0	8.3	0.0	11.3
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.3
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	31.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	458	0	16	323	0	36
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	498	0	17	351	0	39
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			498		884	498
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			498		884	498
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	93
cM capacity (veh/h)			1066		311	572

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	498	17	351	39
Volume Left	0	17	0	0
Volume Right	0	0	0	39
cSH	1700	1066	1700	572
Volume to Capacity	0.29	0.02	0.21	0.07
Queue Length 95th (ft)	0	1	0	5
Control Delay (s)	0.0	8.4	0.0	11.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		11.8
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	34.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	523	0	12	436	0	40
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	539	0	12	449	0	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			539		1013	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			539		1013	539
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	92
cM capacity (veh/h)			1029		261	542

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	539	12	449	41
Volume Left	0	12	0	0
Volume Right	0	0	0	41
cSH	1700	1029	1700	542
Volume to Capacity	0.32	0.01	0.26	0.08
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.5	0.0	12.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		12.2
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

CUMULATIVE BASE CONDITIONS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1833	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1833	
Volume (vph)	54	863	227	37	1360	57	391	155	69	58	131	16
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	56	890	234	38	1402	59	403	160	71	60	135	16
RTOR Reduction (vph)	0	0	122	0	0	31	0	0	57	0	5	0
Lane Group Flow (vph)	56	890	112	38	1402	28	274	289	14	60	146	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.6	39.3	39.3	3.2	38.9	38.9	16.4	16.4	16.4	7.1	7.1	
Effective Green, g (s)	3.6	39.3	39.3	3.2	38.9	38.9	16.4	16.4	16.4	7.1	7.1	
Actuated g/C Ratio	0.04	0.48	0.48	0.04	0.47	0.47	0.20	0.20	0.20	0.09	0.09	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	78	1696	759	69	1679	751	336	346	317	153	159	
v/s Ratio Prot	c0.03	0.25		0.02	c0.40		0.16	c0.17		0.03	c0.08	
v/s Ratio Perm			0.07			0.02			0.01			
v/c Ratio	0.72	0.52	0.15	0.55	0.84	0.04	0.82	0.84	0.04	0.39	0.92	
Uniform Delay, d1	38.7	14.9	12.0	38.7	18.8	11.5	31.4	31.5	26.5	35.4	37.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.9	0.3	0.1	9.2	3.8	0.0	14.1	15.8	0.1	1.7	48.6	
Delay (s)	65.6	15.1	12.1	47.9	22.5	11.6	45.4	47.3	26.5	37.1	85.8	
Level of Service	E	B	B	D	C	B	D	D	C	D	F	
Approach Delay (s)		16.9			22.7			44.2			71.9	
Approach LOS		B			C			D			E	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1727	1583	1770	1802	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1727	1583	1770	1802	
Volume (vph)	51	1004	190	40	1092	48	240	83	72	51	95	26
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	53	1035	196	41	1126	49	247	86	74	53	98	27
RTOR Reduction (vph)	0	0	103	0	0	26	0	0	62	0	12	0
Lane Group Flow (vph)	53	1035	93	41	1126	23	162	171	12	53	113	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.1	35.0	35.0	3.1	35.0	35.0	12.0	12.0	12.0	8.0	8.0	
Effective Green, g (s)	3.1	35.0	35.0	3.1	35.0	35.0	12.0	12.0	12.0	8.0	8.0	
Actuated g/C Ratio	0.04	0.47	0.47	0.04	0.47	0.47	0.16	0.16	0.16	0.11	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	74	1672	748	74	1672	748	272	280	256	191	195	
v/s Ratio Prot	c0.03	0.29		0.02	c0.32		0.10	c0.10		0.03	c0.06	
v/s Ratio Perm			0.06			0.01			0.01			
v/c Ratio	0.72	0.62	0.12	0.55	0.67	0.03	0.60	0.61	0.05	0.28	0.58	
Uniform Delay, d1	35.1	14.6	11.0	34.8	15.1	10.5	28.8	28.9	26.2	30.4	31.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	27.9	0.7	0.1	8.7	1.1	0.0	3.5	3.9	0.1	0.8	4.4	
Delay (s)	63.0	15.3	11.0	43.5	16.2	10.5	32.3	32.8	26.3	31.2	35.8	
Level of Service	E	B	B	D	B	B	C	C	C	C	D	
Approach Delay (s)		16.6			16.9			31.4			34.4	
Approach LOS		B			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	74.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1642	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1642	
Volume (vph)	60	1331	502	47	1047	55	51	142	262	93	51	194
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	62	1372	518	48	1079	57	53	146	270	96	53	200
RTOR Reduction (vph)	0	0	270	0	0	31	0	0	165	0	152	0
Lane Group Flow (vph)	62	1372	248	48	1079	26	53	146	105	96	101	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.1	35.3	35.3	2.0	33.2	33.2	11.3	11.3	11.3	9.2	9.2	
Effective Green, g (s)	4.1	35.3	35.3	2.0	33.2	33.2	11.3	11.3	11.3	9.2	9.2	
Actuated g/C Ratio	0.06	0.48	0.48	0.03	0.45	0.45	0.15	0.15	0.15	0.12	0.12	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	98	1693	757	48	1592	712	257	271	242	221	205	
v/s Ratio Prot	c0.04	c0.39		0.03	0.30		0.03	c0.08		0.05	c0.06	
v/s Ratio Perm			0.16			0.02			0.07			
v/c Ratio	0.63	0.81	0.33	1.00	0.68	0.04	0.21	0.54	0.43	0.43	0.49	
Uniform Delay, d1	34.1	16.4	11.9	35.9	16.1	11.4	27.3	28.8	28.3	29.9	30.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.6	3.1	0.3	129.9	1.2	0.0	0.4	2.1	1.2	1.4	1.8	
Delay (s)	46.7	19.5	12.2	165.8	17.2	11.4	27.7	30.9	29.6	31.3	32.0	
Level of Service	D	B	B	F	B	B	C	C	C	C	C	
Approach Delay (s)		18.4			23.0			29.8			31.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	192	21	143	952	1118	219
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	200	22	149	992	1165	228
RTOR Reduction (vph)	0	18	0	0	0	113
Lane Group Flow (vph)	200	4	149	992	1165	115
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.7	12.7	9.4	48.1	34.7	34.7
Effective Green, g (s)	12.7	12.7	9.4	48.1	34.7	34.7
Actuated g/C Ratio	0.18	0.18	0.14	0.70	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	292	242	2474	1785	798
v/s Ratio Prot	c0.11		c0.08	0.28	c0.33	
v/s Ratio Perm		0.00				0.07
v/c Ratio	0.61	0.01	0.62	0.40	0.65	0.14
Uniform Delay, d1	25.8	22.9	28.0	4.3	12.6	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	0.0	4.6	0.1	0.9	0.1
Delay (s)	29.2	23.0	32.6	4.4	13.5	9.2
Level of Service	C	C	C	A	B	A
Approach Delay (s)	28.5			8.1	12.8	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	123	48	96	833	967	120
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	137	53	107	926	1074	133
RTOR Reduction (vph)	0	45	0	0	0	57
Lane Group Flow (vph)	137	8	107	926	1074	76
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.3	9.3	6.2	46.8	36.6	36.6
Effective Green, g (s)	9.3	9.3	6.2	46.8	36.6	36.6
Actuated g/C Ratio	0.15	0.15	0.10	0.73	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	257	230	171	2584	2021	904
v/s Ratio Prot	c0.08		c0.06	0.26	c0.30	
v/s Ratio Perm		0.00				0.05
v/c Ratio	0.53	0.03	0.63	0.36	0.53	0.08
Uniform Delay, d1	25.4	23.5	27.8	3.2	8.5	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.1	7.0	0.1	0.3	0.0
Delay (s)	27.5	23.6	34.8	3.2	8.7	6.2
Level of Service	C	C	C	A	A	A
Approach Delay (s)	26.4			6.5	8.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	235	91	62	1431	1285	260
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	245	95	65	1491	1339	271
RTOR Reduction (vph)	0	75	0	0	0	122
Lane Group Flow (vph)	245	20	65	1491	1339	149
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.4	14.4	4.6	46.7	38.1	38.1
Effective Green, g (s)	14.4	14.4	4.6	46.7	38.1	38.1
Actuated g/C Ratio	0.21	0.21	0.07	0.68	0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	369	330	118	2392	1951	873
v/s Ratio Prot	c0.14		0.04	c0.42	c0.38	
v/s Ratio Perm		0.01				0.09
v/c Ratio	0.66	0.06	0.55	0.62	0.69	0.17
Uniform Delay, d1	25.1	21.9	31.2	6.3	11.2	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.1	5.5	0.5	1.0	0.1
Delay (s)	29.6	22.0	36.7	6.8	12.2	7.8
Level of Service	C	C	D	A	B	A
Approach Delay (s)	27.5			8.0	11.5	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	11.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Volume (vph)	61	888	99	45	956	1126	36	116	8	1040	140	104
Peak-hour factor, PHF	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. Flow (vph)	61	888	99	45	956	1126	36	116	8	1040	140	104
RTOR Reduction (vph)	0	0	68	0	0	0	0	0	8	0	0	63
Lane Group Flow (vph)	61	888	31	45	956	1126	36	116	0	575	605	41
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	2.8	25.7	25.7	2.1	25.0	80.9	4.9	4.9	4.9	32.2	32.2	32.2
Effective Green, g (s)	2.8	25.7	25.7	2.1	25.0	80.9	4.9	4.9	4.9	32.2	32.2	32.2
Actuated g/C Ratio	0.03	0.32	0.32	0.03	0.31	1.00	0.06	0.06	0.06	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	61	1124	503	46	1094	1583	107	113	96	669	678	630
v/s Ratio Prot	0.03	0.25		0.03	c0.27		0.02	0.06		0.34	c0.36	
v/s Ratio Perm			0.02			c0.71			0.00			0.03
v/c Ratio	1.00	0.79	0.06	0.98	0.87	0.71	0.34	1.03	0.01	0.86	0.89	0.07
Uniform Delay, d1	39.1	25.1	19.2	39.4	26.5	0.0	36.4	38.0	35.7	22.3	22.7	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	115.2	3.9	0.1	123.3	7.9	2.7	1.9	92.0	0.0	10.7	14.1	0.0
Delay (s)	154.3	29.0	19.3	162.6	34.4	2.7	38.3	130.0	35.7	33.0	36.8	15.1
Level of Service	F	C	B	F	C	A	D	F	D	C	D	B
Approach Delay (s)		35.4			20.3			104.6			33.3	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1705	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1705	1583
Volume (vph)	55	820	47	80	897	848	47	66	14	1004	142	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	837	48	82	915	865	48	67	14	1024	145	87
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	13	0	0	52
Lane Group Flow (vph)	56	837	14	82	915	865	48	67	1	569	600	35
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	3.5	23.2	23.2	4.2	23.9	78.1	3.5	3.5	3.5	31.2	31.2	31.2
Effective Green, g (s)	3.5	23.2	23.2	4.2	23.9	78.1	3.5	3.5	3.5	31.2	31.2	31.2
Actuated g/C Ratio	0.04	0.30	0.30	0.05	0.31	1.00	0.04	0.04	0.04	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	79	1051	470	95	1083	1583	79	83	71	672	681	632
v/s Ratio Prot	0.03	0.24		0.05	c0.26		0.03	0.04		0.34	c0.35	
v/s Ratio Perm			0.01			c0.55			0.00			0.02
v/c Ratio	0.71	0.80	0.03	0.86	0.84	0.55	0.61	0.81	0.01	0.85	0.88	0.05
Uniform Delay, d1	36.8	25.3	19.5	36.7	25.4	0.0	36.6	37.0	35.6	21.3	21.7	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	25.1	4.3	0.0	50.8	6.2	1.4	12.5	41.7	0.0	9.7	12.8	0.0
Delay (s)	61.9	29.5	19.5	87.5	31.6	1.4	49.1	78.7	35.7	30.9	34.5	14.4
Level of Service	E	C	B	F	C	A	D	E	D	C	C	B
Approach Delay (s)		31.0			20.0			63.0			31.5	
Approach LOS		C			B			E			C	

Intersection Summary			
HCM Average Control Delay	27.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	78.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Volume (vph)	71	1152	135	80	723	1285	68	161	39	1038	177	162
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	72	1164	136	81	730	1298	69	163	39	1048	179	164
RTOR Reduction (vph)	0	0	91	0	0	0	0	0	36	0	0	104
Lane Group Flow (vph)	72	1164	45	81	730	1298	69	163	3	597	630	60
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Effective Green, g (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Actuated g/C Ratio	0.05	0.33	0.33	0.04	0.32	1.00	0.09	0.09	0.09	0.36	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	1161	520	78	1130	1583	156	164	139	611	621	575
v/s Ratio Prot	0.04	c0.33		0.05	0.21		0.04	0.09		0.36	c0.37	
v/s Ratio Perm			0.03			c0.82			0.00			0.04
v/c Ratio	0.77	1.00	0.09	1.04	0.65	0.82	0.44	0.99	0.02	0.98	1.01	0.10
Uniform Delay, d1	42.4	30.5	21.1	43.4	26.5	0.0	39.3	41.4	37.8	28.5	28.9	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.4	27.0	0.1	112.9	1.3	4.9	2.0	68.1	0.1	30.3	39.8	0.1
Delay (s)	72.8	57.5	21.2	156.3	27.8	4.9	41.3	109.5	37.9	58.9	68.7	19.2
Level of Service	E	E	C	F	C	A	D	F	D	E	E	B
Approach Delay (s)		54.7			18.6			81.8			58.6	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	42.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.98		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4823		1770	5076		1681	1670		1770	1710	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4823		1770	5076		1681	1670		1770	1710	
Volume (vph)	39	1286	675	64	1542	19	561	22	36	24	19	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	40	1312	689	65	1573	19	572	22	37	24	19	23
RTOR Reduction (vph)	0	100	0	0	2	0	0	5	0	0	22	0
Lane Group Flow (vph)	40	1901	0	65	1590	0	321	305	0	24	20	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	2.9	36.5		3.4	37.0		17.5	17.5		2.4	2.4	
Effective Green, g (s)	2.9	36.5		3.4	37.0		17.5	17.5		2.4	2.4	
Actuated g/C Ratio	0.04	0.48		0.04	0.49		0.23	0.23		0.03	0.03	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	2322		79	2478		388	386		56	54	
v/s Ratio Prot	0.02	c0.39		c0.04	0.31		c0.19	0.18		c0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.59	0.82		0.82	0.64		0.83	0.79		0.43	0.37	
Uniform Delay, d1	35.9	16.8		35.9	14.5		27.7	27.4		36.0	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.3	2.4		47.3	0.6		13.5	10.3		5.2	4.2	
Delay (s)	48.2	19.2		83.2	15.0		41.2	37.7		41.2	40.1	
Level of Service	D	B		F	B		D	D		D	D	
Approach Delay (s)		19.8			17.7			39.5			40.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98		0.95	1.00	
Satd. Flow (prot)	1770	4788		1770	5020		1681	1676		1770	1678	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98		0.95	1.00	
Satd. Flow (perm)	1770	4788		1770	5020		1681	1676		1770	1678	
Volume (vph)	224	936	597	75	1458	137	513	120	74	142	91	179
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	238	996	635	80	1551	146	546	128	79	151	97	190
RTOR Reduction (vph)	0	123	0	0	12	0	0	11	0	0	79	0
Lane Group Flow (vph)	238	1508	0	80	1685	0	372	370	0	151	208	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	13.0	40.0		4.8	31.8		17.0	17.0		12.6	12.6	
Effective Green, g (s)	13.0	40.0		4.8	31.8		17.0	17.0		12.6	12.6	
Actuated g/C Ratio	0.14	0.44		0.05	0.35		0.19	0.19		0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	2119		94	1766		316	315		247	234	
v/s Ratio Prot	c0.13	0.31		0.05	c0.34		c0.22	0.22		0.09	c0.12	
v/s Ratio Perm												
v/c Ratio	0.93	0.71		0.85	0.95		1.18	1.18		0.61	0.89	
Uniform Delay, d1	38.3	20.5		42.4	28.6		36.7	36.7		36.6	38.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.5	1.2		48.3	12.2		107.8	107.4		4.4	30.7	
Delay (s)	76.7	21.7		90.8	40.8		144.5	144.1		41.0	68.9	
Level of Service	E	C		F	D		F	F		D	E	
Approach Delay (s)		28.7			43.1			144.3			59.3	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4845		1770	5081		1681	1667		1770	1745	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4845		1770	5081		1681	1667		1770	1745	
Volume (vph)	24	1500	688	41	1241	8	866	10	51	28	28	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	24	1531	702	42	1266	8	884	10	52	29	29	21
RTOR Reduction (vph)	0	88	0	0	1	0	0	5	0	0	20	0
Lane Group Flow (vph)	24	2145	0	42	1273	0	489	452	0	29	30	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Effective Green, g (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Actuated g/C Ratio	0.02	0.47		0.03	0.48		0.27	0.27		0.04	0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	38	2263		56	2425		462	458		78	77	
v/s Ratio Prot	0.01	c0.44		c0.02	0.25		c0.29	0.27		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.63	0.95		0.75	0.53		1.06	0.99		0.37	0.39	
Uniform Delay, d1	42.7	22.4		42.3	16.0		31.9	31.7		40.9	40.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.5	9.4		42.7	0.2		58.2	38.2		3.0	3.2	
Delay (s)	72.2	31.8		84.9	16.3		90.1	70.0		43.8	44.1	
Level of Service	E	C		F	B		F	E		D	D	
Approach Delay (s)		32.2			18.4			80.4			44.0	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3480	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3480	
Volume (vph)	59	368	195	104	302	105	182	752	126	111	708	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	387	205	109	318	111	192	792	133	117	745	93
RTOR Reduction (vph)	0	0	147	0	0	77	0	0	90	0	10	0
Lane Group Flow (vph)	62	387	58	109	318	34	192	792	43	117	828	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.5	24.5	7.5	22.8	
Effective Green, g (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.5	24.5	7.5	22.8	
Actuated g/C Ratio	0.05	0.28	0.28	0.08	0.31	0.31	0.12	0.33	0.33	0.10	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	94	523	444	144	575	488	217	1153	516	177	1055	
v/s Ratio Prot	0.04	c0.21		c0.06	0.17		c0.11	0.22		0.07	c0.24	
v/s Ratio Perm			0.04			0.02			0.03			
v/c Ratio	0.66	0.74	0.13	0.76	0.55	0.07	0.88	0.69	0.08	0.66	0.78	
Uniform Delay, d1	34.9	24.6	20.2	33.8	21.7	18.4	32.5	22.0	17.6	32.6	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	5.4	0.1	20.1	1.2	0.1	31.9	1.7	0.1	8.9	3.9	
Delay (s)	50.4	30.0	20.3	53.9	22.8	18.4	64.4	23.7	17.6	41.5	27.8	
Level of Service	D	C	C	D	C	B	E	C	B	D	C	
Approach Delay (s)		28.9			28.2			30.0			29.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3497	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3497	
Volume (vph)	81	271	174	91	277	155	147	808	92	117	865	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	82	274	176	92	280	157	148	816	93	118	874	75
RTOR Reduction (vph)	0	0	142	0	0	125	0	0	52	0	6	0
Lane Group Flow (vph)	82	274	34	92	280	32	148	816	41	118	943	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Effective Green, g (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Actuated g/C Ratio	0.06	0.19	0.19	0.07	0.20	0.20	0.11	0.44	0.44	0.10	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	110	360	306	128	379	322	193	1559	698	173	1502	
v/s Ratio Prot	0.05	0.15		c0.05	c0.15		c0.08	0.23		0.07	c0.27	
v/s Ratio Perm			0.02			0.02			0.03			
v/c Ratio	0.75	0.76	0.11	0.72	0.74	0.10	0.77	0.52	0.06	0.68	0.63	
Uniform Delay, d1	37.7	31.2	27.2	37.1	30.5	26.5	35.4	16.6	13.1	35.6	18.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.7	9.2	0.2	17.5	7.4	0.1	16.5	1.3	0.2	10.6	2.0	
Delay (s)	61.3	40.3	27.3	54.6	37.9	26.6	51.9	17.9	13.3	46.2	20.2	
Level of Service	E	D	C	D	D	C	D	B	B	D	C	
Approach Delay (s)		39.3			37.4			22.2			23.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3438	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3438	
Volume (vph)	141	496	159	40	364	236	135	584	111	199	681	161
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	142	501	161	40	368	238	136	590	112	201	688	163
RTOR Reduction (vph)	0	0	104	0	0	171	0	0	81	0	23	0
Lane Group Flow (vph)	142	501	57	40	368	67	136	590	31	201	828	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.0	21.0	9.3	23.0	
Effective Green, g (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.0	21.0	9.3	23.0	
Actuated g/C Ratio	0.10	0.35	0.35	0.03	0.28	0.28	0.10	0.28	0.28	0.12	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	660	561	47	526	447	173	994	444	220	1057	
v/s Ratio Prot	c0.08	c0.27		0.02	0.20		0.08	0.17		c0.11	c0.24	
v/s Ratio Perm			0.04			0.04			0.02			
v/c Ratio	0.81	0.76	0.10	0.85	0.70	0.15	0.79	0.59	0.07	0.91	0.78	
Uniform Delay, d1	33.0	21.3	16.2	36.3	24.0	20.1	33.0	23.2	19.7	32.4	23.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.0	5.0	0.1	77.3	4.1	0.2	20.5	1.0	0.1	37.6	3.9	
Delay (s)	57.0	26.3	16.3	113.5	28.1	20.3	53.5	24.2	19.8	70.0	27.5	
Level of Service	E	C	B	F	C	C	D	C	B	E	C	
Approach Delay (s)		29.7			30.5			28.4			35.6	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	128	582	161	261	583	204	175	1120	526	329	945	111
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	135	613	169	275	614	215	184	1179	554	346	995	117
RTOR Reduction (vph)	0	0	139	0	0	174	0	0	162	0	0	68
Lane Group Flow (vph)	135	613	30	275	614	41	184	1179	392	346	995	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Effective Green, g (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Actuated g/C Ratio	0.08	0.18	0.18	0.09	0.19	0.19	0.14	0.36	0.36	0.20	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	629	281	305	668	299	240	1258	563	354	1486	665
v/s Ratio Prot	0.08	0.17		c0.08	c0.17		0.10	c0.33		c0.20	0.28	
v/s Ratio Perm			0.02			0.03			0.25			0.03
v/c Ratio	0.98	0.97	0.11	0.90	0.92	0.14	0.77	0.94	0.70	0.98	0.67	0.07
Uniform Delay, d1	41.4	36.8	31.0	40.6	35.8	30.4	37.5	28.0	24.8	35.8	21.1	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.2	29.3	0.2	27.9	17.7	0.2	13.6	13.0	3.7	41.3	1.2	0.0
Delay (s)	110.6	66.1	31.2	68.5	53.5	30.6	51.1	41.0	28.6	77.1	22.2	15.7
Level of Service	F	E	C	E	D	C	D	D	C	E	C	B
Approach Delay (s)		66.2			52.8			38.4			34.7	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	45.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	122	589	138	195	568	168	105	1082	519	363	1048	112
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	124	601	141	199	580	171	107	1104	530	370	1069	114
RTOR Reduction (vph)	0	0	114	0	0	141	0	0	150	0	0	60
Lane Group Flow (vph)	124	601	27	199	580	30	107	1104	380	370	1069	54
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.6	31.3	31.3	19.9	42.6	42.6
Effective Green, g (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.6	31.3	31.3	19.9	42.6	42.6
Actuated g/C Ratio	0.08	0.19	0.19	0.07	0.18	0.18	0.10	0.35	0.35	0.22	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	667	298	228	628	281	169	1228	549	390	1671	748
v/s Ratio Prot	c0.07	c0.17		0.06	0.16		0.06	c0.31		c0.21	0.30	
v/s Ratio Perm			0.02			0.02			0.24			0.03
v/c Ratio	0.91	0.90	0.09	0.87	0.92	0.11	0.63	0.90	0.69	0.95	0.64	0.07
Uniform Delay, d1	41.3	35.8	30.2	41.7	36.5	31.1	39.3	28.0	25.3	34.6	18.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.0	15.4	0.1	28.6	19.3	0.2	7.5	9.0	3.8	32.2	0.8	0.0
Delay (s)	90.3	51.1	30.3	70.3	55.8	31.3	46.8	36.9	29.1	66.9	18.8	13.0
Level of Service	F	D	C	E	E	C	D	D	C	E	B	B
Approach Delay (s)		53.4			54.5			35.2			29.8	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	150	603	63	712	679	199	112	884	438	473	570	137
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	655	68	774	738	216	122	961	476	514	620	149
RTOR Reduction (vph)	0	0	57	0	0	163	0	0	261	0	0	95
Lane Group Flow (vph)	163	655	11	774	738	53	122	961	215	514	620	54
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Effective Green, g (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Actuated g/C Ratio	0.10	0.16	0.16	0.19	0.24	0.24	0.12	0.24	0.24	0.23	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	551	246	648	865	387	205	865	387	413	1282	573
v/s Ratio Prot	0.09	c0.19		c0.23	0.21		0.07	c0.27		c0.29	0.18	
v/s Ratio Perm			0.01			0.03			0.14			0.03
v/c Ratio	0.92	1.19	0.04	1.19	0.85	0.14	0.60	1.11	0.56	1.24	0.48	0.09
Uniform Delay, d1	40.1	38.0	32.3	36.5	32.5	26.6	37.8	34.0	29.7	34.5	22.2	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.4	102.1	0.1	102.1	8.2	0.2	4.6	65.8	1.7	129.0	0.3	0.1
Delay (s)	85.5	140.1	32.4	138.6	40.6	26.7	42.4	99.8	31.5	163.5	22.5	19.0
Level of Service	F	F	C	F	D	C	D	F	C	F	C	B
Approach Delay (s)		121.8			82.8			74.4			78.6	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	85.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4972		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4972		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	84	617	108	604	1340	200	161	527	536	191	587	104
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	630	110	616	1367	204	164	538	547	195	599	106
RTOR Reduction (vph)	0	27	0	0	0	117	0	0	37	0	0	83
Lane Group Flow (vph)	86	713	0	616	1367	87	164	538	510	195	599	23
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases						8						6
Actuated Green, G (s)	4.5	20.2		20.3	36.0	36.0	9.7	16.9	41.2	11.4	18.6	18.6
Effective Green, g (s)	4.5	20.2		20.3	36.0	36.0	9.7	16.9	41.2	11.4	18.6	18.6
Actuated g/C Ratio	0.05	0.24		0.24	0.42	0.42	0.11	0.20	0.49	0.13	0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	94	1184		822	1502	672	202	705	769	238	776	347
v/s Ratio Prot	0.05	0.14		0.18	c0.39		0.09	0.15	c0.32	c0.11	c0.17	
v/s Ratio Perm						0.05						0.01
v/c Ratio	0.91	0.60		0.75	0.91	0.13	0.81	0.76	0.66	0.82	0.77	0.07
Uniform Delay, d1	40.0	28.7		29.9	22.9	14.9	36.7	32.1	16.5	35.7	31.1	26.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	65.2	0.9		3.8	8.6	0.1	21.4	4.9	2.2	19.3	4.8	0.1
Delay (s)	105.2	29.6		33.7	31.5	14.9	58.0	37.0	18.7	55.0	35.9	26.3
Level of Service	F	C		C	C	B	E	D	B	D	D	C
Approach Delay (s)		37.5			30.5			31.7			38.9	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4993		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4993		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	50	645	88	497	1062	126	97	551	453	108	487	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	679	93	523	1118	133	102	580	477	114	513	65
RTOR Reduction (vph)	0	19	0	0	0	75	0	0	70	0	0	50
Lane Group Flow (vph)	53	753	0	523	1118	58	102	580	407	114	513	15
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	2.5	19.4		16.6	33.5	33.5	7.1	17.1	33.7	7.3	17.3	17.3
Effective Green, g (s)	2.5	19.4		16.6	33.5	33.5	7.1	17.1	33.7	7.3	17.3	17.3
Actuated g/C Ratio	0.03	0.25		0.22	0.44	0.44	0.09	0.22	0.44	0.10	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	58	1268		746	1552	694	164	792	781	169	801	358
v/s Ratio Prot	0.03	0.15		c0.15	c0.32		0.06	c0.16	c0.11	c0.06	0.14	
v/s Ratio Perm						0.04			0.14			0.01
v/c Ratio	0.91	0.59		0.70	0.72	0.08	0.62	0.73	0.52	0.67	0.64	0.04
Uniform Delay, d1	36.8	25.0		27.6	17.6	12.5	33.4	27.5	15.5	33.4	26.7	23.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	86.9	0.8		3.0	1.7	0.1	7.1	3.5	0.6	10.2	1.8	0.0
Delay (s)	123.7	25.8		30.6	19.3	12.6	40.5	31.0	16.1	43.6	28.5	23.1
Level of Service	F	C		C	B	B	D	C	B	D	C	C
Approach Delay (s)		32.1			22.1			25.7			30.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4982		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4982		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	121	1302	204	480	868	151	122	604	729	115	636	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	122	1315	206	485	877	153	123	610	736	116	642	75
RTOR Reduction (vph)	0	23	0	0	0	89	0	0	12	0	0	59
Lane Group Flow (vph)	122	1498	0	485	877	64	123	610	724	116	642	16
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Effective Green, g (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Actuated g/C Ratio	0.12	0.31		0.22	0.42	0.42	0.08	0.22	0.44	0.07	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	204	1559		767	1491	667	138	771	769	119	732	327
v/s Ratio Prot	0.07	c0.30		0.14	0.25		c0.07	0.17	c0.21	0.07	0.18	
v/s Ratio Perm						0.04			0.25			0.01
v/c Ratio	0.60	0.96		0.63	0.59	0.10	0.89	0.79	0.94	0.97	0.88	0.05
Uniform Delay, d1	37.6	30.2		31.4	19.9	15.6	40.9	33.1	23.9	41.7	34.4	28.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	14.5		1.7	0.6	0.1	45.6	5.6	19.5	74.0	11.5	0.1
Delay (s)	42.3	44.7		33.1	20.5	15.7	86.5	38.6	43.4	115.7	45.9	28.5
Level of Service	D	D		C	C	B	F	D	D	F	D	C
Approach Delay (s)		44.5			24.1			45.0			54.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	447	814	1606	0	0	379
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	452	822	1622	0	0	383
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1622				2936	811
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1622				2936	811
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	0
cM capacity (veh/h)	397				0	322

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	452	411	411	811	811	383
Volume Left	452	0	0	0	0	0
Volume Right	0	0	0	0	0	383
cSH	397	1700	1700	1700	1700	322
Volume to Capacity	1.14	0.24	0.24	0.48	0.48	1.19
Queue Length 95th (ft)	421	0	0	0	0	408
Control Delay (s)	119.5	0.0	0.0	0.0	0.0	146.3
Lane LOS	F					F
Approach Delay (s)	42.4			0.0		146.3
Approach LOS						F

Intersection Summary			
Average Delay	33.5		
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	487	925	1301	0	0	313
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	492	934	1314	0	0	316
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1314				2765	657
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1314				2765	657
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	6				100	22
cM capacity (veh/h)	522				1	407

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	492	467	467	657	657	316
Volume Left	492	0	0	0	0	0
Volume Right	0	0	0	0	0	316
cSH	522	1700	1700	1700	1700	407
Volume to Capacity	0.94	0.27	0.27	0.39	0.39	0.78
Queue Length 95th (ft)	296	0	0	0	0	165
Control Delay (s)	54.5	0.0	0.0	0.0	0.0	38.5
Lane LOS	F					E
Approach Delay (s)	18.8			0.0		38.5
Approach LOS						E

Intersection Summary			
Average Delay	12.7		
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	571	1560	1076	0	0	476
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	589	1608	1109	0	0	491
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1109				3091	555
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1109				3091	555
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	6				100	0
cM capacity (veh/h)	625				1	476

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	589	804	804	555	555	491
Volume Left	589	0	0	0	0	0
Volume Right	0	0	0	0	0	491
cSH	625	1700	1700	1700	1700	476
Volume to Capacity	0.94	0.47	0.47	0.33	0.33	1.03
Queue Length 95th (ft)	319	0	0	0	0	364
Control Delay (s)	48.7	0.0	0.0	0.0	0.0	79.5
Lane LOS	E					F
Approach Delay (s)	13.1			0.0		79.5
Approach LOS						F

Intersection Summary			
Average Delay	17.8		
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3510		3433	3539	1583		1827	1583		2909	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3510		3433	3539	1583		1827	1583		2909	1346
Volume (vph)	0	935	55	296	1363	174	99	151	233	147	68	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	974	57	308	1420	181	103	157	243	153	71	21
RTOR Reduction (vph)	0	5	0	0	0	67	0	0	210	0	0	18
Lane Group Flow (vph)	0	1026	0	308	1420	114	0	260	33	0	224	3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		Over	Split		Perm
Protected Phases		4		3	8		6	6	3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		27.8		10.8	42.6	42.6		15.5	10.8		9.5	9.5
Effective Green, g (s)		27.8		10.8	42.6	42.6		15.5	10.8		9.5	9.5
Actuated g/C Ratio		0.35		0.14	0.54	0.54		0.19	0.14		0.12	0.12
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1226		466	1894	847		356	215		347	161
v/s Ratio Prot		c0.29		0.09	c0.40			c0.14	0.02		c0.08	
v/s Ratio Perm						0.07						0.00
v/c Ratio		0.84		0.66	0.75	0.13		0.73	0.15		0.86dl	0.02
Uniform Delay, d1		23.8		32.7	14.4	9.3		30.1	30.4		33.4	30.9
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.1		3.5	1.7	0.1		7.5	0.3		4.1	0.0
Delay (s)		29.0		36.2	16.0	9.3		37.6	30.7		37.5	31.0
Level of Service		C		D	B	A		D	C		D	C
Approach Delay (s)		29.0			18.6			34.3			37.0	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3513		3433	3539	1583		1833	1583		2918	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3513		3433	3539	1583		1833	1583		2918	1346
Volume (vph)	0	937	48	289	1237	181	60	126	284	181	112	33
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	976	50	301	1289	189	62	131	296	189	117	34
RTOR Reduction (vph)	0	4	0	0	0	77	0	0	56	0	0	29
Lane Group Flow (vph)	0	1022	0	301	1289	112	0	193	240	0	306	5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		27.5		10.3	41.8	41.8		13.0	27.3		12.2	12.2
Effective Green, g (s)		27.5		10.3	41.8	41.8		13.0	27.3		12.2	12.2
Actuated g/C Ratio		0.35		0.13	0.53	0.53		0.16	0.35		0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1223		448	1873	838		302	547		451	208
v/s Ratio Prot		c0.29		0.09	c0.36			c0.11	0.15		c0.10	
v/s Ratio Perm						0.07						0.00
v/c Ratio		0.84		0.67	0.69	0.13		0.64	0.44		0.68	0.03
Uniform Delay, d1		23.7		32.7	13.8	9.4		30.8	19.9		31.5	28.4
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.1		3.9	1.1	0.1		4.4	0.6		4.0	0.0
Delay (s)		28.8		36.7	14.8	9.5		35.2	20.5		35.6	28.4
Level of Service		C		D	B	A		D	C		D	C
Approach Delay (s)		28.8			18.0			26.3			34.9	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3514		3433	3539	1583		1832	1583		3185	1468
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3514		3433	3539	1583		1832	1583		3185	1468
Volume (vph)	0	1428	72	366	1030	188	92	185	500	225	145	35
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1457	73	373	1051	192	94	189	510	230	148	36
RTOR Reduction (vph)	0	4	0	0	0	85	0	0	14	0	0	32
Lane Group Flow (vph)	0	1526	0	373	1051	107	0	283	496	0	378	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	10%	10%	10%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		37.0		9.0	50.0	50.0		18.0	31.0		10.0	10.0
Effective Green, g (s)		37.0		9.0	50.0	50.0		18.0	31.0		10.0	10.0
Actuated g/C Ratio		0.41		0.10	0.56	0.56		0.20	0.34		0.11	0.11
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1445		343	1966	879		366	545		354	163
v/s Ratio Prot		c0.43		0.11	0.30			0.15	c0.31		c0.12	
v/s Ratio Perm						0.07						0.00
v/c Ratio		1.06		1.09	0.53	0.12		0.77	0.91		1.26dl	0.02
Uniform Delay, d1		26.5		40.5	12.6	9.5		34.1	28.2		40.0	35.7
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		40.0		74.0	0.3	0.1		9.8	19.4		67.0	0.1
Delay (s)		66.5		114.5	12.9	9.6		43.8	47.6		107.0	35.7
Level of Service		E		F	B	A		D	D		F	D
Approach Delay (s)		66.5			36.0			46.2			100.8	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM Average Control Delay	54.7	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	178	1010	1501	11	0	142
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	182	1031	1532	11	0	145
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.65				0.71	0.65
vC, conflicting volume	1543				2416	771
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1297				2099	111
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	47				100	76
cM capacity (veh/h)	345				15	599

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	182	515	515	1021	522	145
Volume Left	182	0	0	0	0	0
Volume Right	0	0	0	0	11	145
cSH	345	1700	1700	1700	1700	599
Volume to Capacity	0.53	0.30	0.30	0.60	0.31	0.24
Queue Length 95th (ft)	73	0	0	0	0	24
Control Delay (s)	26.5	0.0	0.0	0.0	0.0	12.9
Lane LOS	D					B
Approach Delay (s)	4.0			0.0		12.9
Approach LOS						B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	166	1086	1393	15	0	150
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	175	1143	1466	16	0	158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.71				0.77	0.71
vC, conflicting volume	1482				2395	741
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1270				2082	226
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	55				100	71
cM capacity (veh/h)	385				19	551

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	175	572	572	978	505	158
Volume Left	175	0	0	0	0	0
Volume Right	0	0	0	0	16	158
cSH	385	1700	1700	1700	1700	551
Volume to Capacity	0.45	0.34	0.34	0.58	0.30	0.29
Queue Length 95th (ft)	57	0	0	0	0	29
Control Delay (s)	21.9	0.0	0.0	0.0	0.0	14.1
Lane LOS	C					B
Approach Delay (s)	2.9			0.0		14.1
Approach LOS						B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	112	1481	1218	9	0	169
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	113	1496	1230	9	0	171
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		657	984			
pX, platoon unblocked	0.82				0.81	0.82
vC, conflicting volume	1239				2209	620
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1069				1580	311
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	79				100	70
cM capacity (veh/h)	529				63	560

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	113	748	748	820	419	171
Volume Left	113	0	0	0	0	0
Volume Right	0	0	0	0	9	171
cSH	529	1700	1700	1700	1700	560
Volume to Capacity	0.21	0.44	0.44	0.48	0.25	0.30
Queue Length 95th (ft)	20	0	0	0	0	32
Control Delay (s)	13.6	0.0	0.0	0.0	0.0	14.2
Lane LOS	B					B
Approach Delay (s)	1.0			0.0		14.2
Approach LOS						B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	145	44	26	292	211	107
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	171	52	31	344	248	126
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	653	248	374			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	653	248	374			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	59	93	97			
cM capacity (veh/h)	421	790	1184			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	171	52	374	248	126
Volume Left	171	0	31	0	0
Volume Right	0	52	0	0	126
cSH	421	790	1184	1700	1700
Volume to Capacity	0.41	0.07	0.03	0.15	0.07
Queue Length 95th (ft)	48	5	2	0	0
Control Delay (s)	19.3	9.9	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	17.1		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	153	28	25	307	250	129
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	170	31	28	341	278	143
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	674	278	421			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	674	278	421			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	58	96	98			
cM capacity (veh/h)	409	761	1138			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	170	31	369	278	143
Volume Left	170	0	28	0	0
Volume Right	0	31	0	0	143
cSH	409	761	1138	1700	1700
Volume to Capacity	0.42	0.04	0.02	0.16	0.08
Queue Length 95th (ft)	50	3	2	0	0
Control Delay (s)	19.9	9.9	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	18.4		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	90	32	48	335	364	177
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	112	40	60	419	455	221
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked	0.99					
vC, conflicting volume	994	455	676			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994	455	676			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	55	93	93			
cM capacity (veh/h)	252	605	915			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	112	40	479	455	221
Volume Left	112	0	60	0	0
Volume Right	0	40	0	0	221
cSH	252	605	915	1700	1700
Volume to Capacity	0.45	0.07	0.07	0.27	0.13
Queue Length 95th (ft)	54	5	5	0	0
Control Delay (s)	30.3	11.4	1.9	0.0	0.0
Lane LOS	D	B	A		
Approach Delay (s)	25.3		1.9	0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	7	159	0	20	4	195	199	26	188	2
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	8	187	0	24	4	229	234	31	221	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	545	756	222	646	640	346	223			464		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	545	756	222	646	640	346	223			464		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	50	100	97	100			97		
cM capacity (veh/h)	424	327	817	372	381	697	1345			1098		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	9	211	4	464	254
Volume Left	1	187	4	0	31
Volume Right	8	24	0	234	2
cSH	732	392	1345	1700	1098
Volume to Capacity	0.01	0.54	0.00	0.27	0.03
Queue Length 95th (ft)	1	77	0	0	2
Control Delay (s)	10.0	24.3	7.7	0.0	1.2
Lane LOS	A	C	A		A
Approach Delay (s)	10.0	24.3	0.1		1.2
Approach LOS	A	C			

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	12	171	0	25	5	197	249	32	193	1
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	13	201	0	29	5	232	293	38	227	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	575	838	228	705	693	378	228			525		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	575	838	228	705	693	378	228			525		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	40	100	96	100			96		
cM capacity (veh/h)	398	290	812	335	352	669	1340			1042		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	14	231	5	525	266
Volume Left	1	201	5	0	38
Volume Right	13	29	0	293	1
cSH	751	358	1340	1700	1042
Volume to Capacity	0.02	0.64	0.00	0.31	0.04
Queue Length 95th (ft)	1	107	0	0	3
Control Delay (s)	9.9	31.6	7.7	0.0	1.5
Lane LOS	A	D	A		A
Approach Delay (s)	9.9	31.6	0.1		1.5
Approach LOS	A	D			

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	2	7	253	0	17	7	217	247	26	276	3
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	0	2	8	284	0	19	8	244	278	29	310	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	647	905	310	775	770	383	313			521		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	647	905	310	775	770	383	313			521		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	6	100	97	99			97		
cM capacity (veh/h)	364	267	730	302	320	665	1247			1045		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	303	8	521	339	3
Volume Left	0	284	8	0	29	0
Volume Right	8	19	0	278	0	3
cSH	527	313	1247	1700	1045	1700
Volume to Capacity	0.02	0.97	0.01	0.31	0.03	0.00
Queue Length 95th (ft)	1	253	0	0	2	0
Control Delay (s)	12.0	81.1	7.9	0.0	1.0	0.0
Lane LOS	B	F	A		A	
Approach Delay (s)	12.0	81.1	0.1		1.0	
Approach LOS	B	F				

Intersection Summary			
Average Delay	21.2		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5075		1770	1619			1779	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.71	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5075		1365	1619			1332	1583
Volume (vph)	38	1195	82	64	1535	22	50	4	26	34	2	32
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	39	1219	84	65	1566	22	51	4	27	35	2	33
RTOR Reduction (vph)	0	0	28	0	1	0	0	25	0	0	0	30
Lane Group Flow (vph)	39	1219	56	65	1587	0	51	6	0	0	37	3
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.5	49.6	49.6	6.1	52.2		6.2	6.2			6.2	6.2
Effective Green, g (s)	3.5	49.6	49.6	6.1	52.2		6.2	6.2			6.2	6.2
Actuated g/C Ratio	0.05	0.67	0.67	0.08	0.71		0.08	0.08			0.08	0.08
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	84	2375	1062	146	3585		115	136			112	133
v/s Ratio Prot	0.02	c0.34		c0.04	c0.31			0.00				
v/s Ratio Perm			0.04				c0.04				0.03	0.00
v/c Ratio	0.46	0.51	0.05	0.45	0.44		0.44	0.05			0.33	0.02
Uniform Delay, d1	34.3	6.1	4.1	32.3	4.6		32.2	31.1			31.9	31.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	4.0	0.2	0.0	2.2	0.1		2.7	0.1			1.7	0.1
Delay (s)	38.3	6.3	4.2	34.4	4.7		34.9	31.3			33.6	31.1
Level of Service	D	A	A	C	A		C	C			C	C
Approach Delay (s)		7.1			5.9			33.5			32.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5070		1770	1623			1776	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.69	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5070		1317	1623			1285	1583
Volume (vph)	45	1007	99	79	1487	31	91	8	47	71	2	91
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	1060	104	83	1565	33	96	8	49	75	2	96
RTOR Reduction (vph)	0	0	38	0	2	0	0	44	0	0	0	86
Lane Group Flow (vph)	47	1060	66	83	1596	0	96	13	0	0	77	10
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.4	44.8	44.8	6.2	47.6		7.6	7.6			7.6	7.6
Effective Green, g (s)	3.4	44.8	44.8	6.2	47.6		7.6	7.6			7.6	7.6
Actuated g/C Ratio	0.05	0.63	0.63	0.09	0.67		0.11	0.11			0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	85	2246	1005	155	3418		142	175			138	170
v/s Ratio Prot	0.03	0.30		c0.05	c0.31			0.01				
v/s Ratio Perm			0.04				c0.07				0.06	0.01
v/c Ratio	0.55	0.47	0.07	0.54	0.47		0.68	0.08			0.56	0.06
Uniform Delay, d1	32.9	6.7	4.9	30.8	5.5		30.3	28.3			29.9	28.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.6	0.2	0.0	3.5	0.1		12.0	0.2			4.8	0.2
Delay (s)	40.4	6.9	4.9	34.3	5.6		42.3	28.5			34.7	28.4
Level of Service	D	A	A	C	A		D	C			C	C
Approach Delay (s)		8.0			7.0			37.2			31.2	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5077		1770	1598			1792	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.76	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5077		1359	1598			1419	1583
Volume (vph)	26	1434	124	97	1129	12	140	4	72	32	9	34
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1463	127	99	1152	12	143	4	73	33	9	35
RTOR Reduction (vph)	0	0	49	0	1	0	0	62	0	0	0	30
Lane Group Flow (vph)	27	1463	78	99	1163	0	143	15	0	0	42	5
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	1.7	48.4	48.4	7.3	54.0		11.5	11.5			11.5	11.5
Effective Green, g (s)	1.7	48.4	48.4	7.3	54.0		11.5	11.5			11.5	11.5
Actuated g/C Ratio	0.02	0.61	0.61	0.09	0.68		0.15	0.15			0.15	0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	38	2163	967	163	3462		197	232			206	230
v/s Ratio Prot	0.02	c0.41		c0.06	0.23			0.01				
v/s Ratio Perm			0.05				c0.11				0.03	0.00
v/c Ratio	0.71	0.68	0.08	0.61	0.34		0.73	0.06			0.20	0.02
Uniform Delay, d1	38.5	10.2	6.3	34.6	5.2		32.3	29.2			29.8	29.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	47.3	0.9	0.0	6.3	0.1		12.5	0.1			0.5	0.0
Delay (s)	85.8	11.1	6.3	40.8	5.3		44.8	29.3			30.3	29.1
Level of Service	F	B	A	D	A		D	C			C	C
Approach Delay (s)		11.9			8.0			39.4			29.7	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	803	11	90	1600	19	7	21	26	2	10	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	828	11	93	1649	21	7	23	27	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1670			839			1849	2689	420	2287	2674	825
vC1, stage 1 conf vol							834	834		1835	1835	
vC2, stage 2 conf vol							1016	1856		452	839	
vCu, unblocked vol	1670			839			1849	2689	420	2287	2674	825
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			88			96	77	95	97	89	100
cM capacity (veh/h)	381			791			171	101	582	67	101	316

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	552	287	93	825	825	21	57	13
Volume Left	0	0	93	0	0	0	7	2
Volume Right	0	11	0	0	0	21	27	0
cSH	1700	1700	791	1700	1700	1700	181	93
Volume to Capacity	0.32	0.17	0.12	0.49	0.49	0.01	0.31	0.14
Queue Length 95th (ft)	0	0	10	0	0	0	32	12
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	0.0	33.7	50.0
Lane LOS			B				D	F
Approach Delay (s)	0.0		0.5				33.7	50.0
Approach LOS							D	F

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	878	47	71	1298	25	3	25	41	2	15	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	905	48	73	1338	27	3	27	42	2	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1365			954			1753	2441	477	1993	2438	669
vC1, stage 1 conf vol							929	929		1485	1485	
vC2, stage 2 conf vol							824	1512		508	954	
vCu, unblocked vol	1365			954			1753	2441	477	1993	2438	669
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			98	81	92	98	88	100
cM capacity (veh/h)	499			716			196	144	535	110	139	400

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	603	350	73	669	669	27	73	18
Volume Left	0	0	73	0	0	0	3	2
Volume Right	0	48	0	0	0	27	42	0
cSH	1700	1700	716	1700	1700	1700	256	135
Volume to Capacity	0.35	0.21	0.10	0.39	0.39	0.02	0.28	0.14
Queue Length 95th (ft)	0	0	8	0	0	0	28	12
Control Delay (s)	0.0	0.0	10.6	0.0	0.0	0.0	24.6	35.9
Lane LOS			B				C	E
Approach Delay (s)	0.0		0.5				24.6	35.9
Approach LOS							C	E

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1543	17	26	1058	27	17	16	34	2	11	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1591	18	27	1091	28	18	16	35	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1119			1608			2204	2772	804	1983	2753	545
vC1, stage 1 conf vol							1599	1599		1144	1144	
vC2, stage 2 conf vol							605	1172		839	1608	
vCu, unblocked vol	1119			1608			2204	2772	804	1983	2753	545
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			83	87	89	99	90	100
cM capacity (veh/h)	620			402			104	132	326	149	116	482

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	1060	548	27	545	545	28	69	13
Volume Left	0	0	27	0	0	0	18	2
Volume Right	0	18	0	0	0	28	35	0
cSH	1700	1700	402	1700	1700	1700	172	120
Volume to Capacity	0.62	0.32	0.07	0.32	0.32	0.02	0.40	0.11
Queue Length 95th (ft)	0	0	5	0	0	0	44	9
Control Delay (s)	0.0	0.0	14.6	0.0	0.0	0.0	39.2	38.7
Lane LOS			B				E	E
Approach Delay (s)	0.0		0.3				39.2	38.7
Approach LOS							E	E

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	447	0	12	379	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	486	0	13	412	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			486		924	486
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			486		924	486
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	93
cM capacity (veh/h)			1077		295	581

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	486	13	412	42
Volume Left	0	13	0	0
Volume Right	0	0	0	42
cSH	1700	1077	1700	581
Volume to Capacity	0.29	0.01	0.24	0.07
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.4	0.0	11.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.7
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	496	0	17	349	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	539	0	18	379	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			539		955	539
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			539		955	539
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	92
cM capacity (veh/h)			1029		281	542

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	539	18	379	42
Volume Left	0	18	0	0
Volume Right	0	0	0	42
cSH	1700	1029	1700	542
Volume to Capacity	0.32	0.02	0.22	0.08
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.6	0.0	12.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		12.2
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	571	0	13	476	0	44
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	589	0	13	491	0	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			589		1106	589
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			589		1106	589
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	91
cM capacity (veh/h)			987		230	508

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	589	13	491	45
Volume Left	0	13	0	0
Volume Right	0	0	0	45
cSH	1700	987	1700	508
Volume to Capacity	0.35	0.01	0.29	0.09
Queue Length 95th (ft)	0	1	0	7
Control Delay (s)	0.0	8.7	0.0	12.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		12.8
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	40.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1821	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1821	
Volume (vph)	63	860	227	37	1360	57	391	155	69	58	131	23
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	65	887	234	38	1402	59	403	160	71	60	135	24
RTOR Reduction (vph)	0	0	123	0	0	31	0	0	57	0	7	0
Lane Group Flow (vph)	65	887	111	38	1402	28	274	289	14	60	152	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.6	38.9	38.9	3.2	38.5	38.5	16.6	16.6	16.6	7.1	7.1	
Effective Green, g (s)	3.6	38.9	38.9	3.2	38.5	38.5	16.6	16.6	16.6	7.1	7.1	
Actuated g/C Ratio	0.04	0.48	0.48	0.04	0.47	0.47	0.20	0.20	0.20	0.09	0.09	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	78	1683	753	69	1666	745	341	351	321	154	158	
v/s Ratio Prot	c0.04	0.25		0.02	c0.40		0.16	c0.17		0.03	c0.08	
v/s Ratio Perm			0.07			0.02			0.01			
v/c Ratio	0.83	0.53	0.15	0.55	0.84	0.04	0.80	0.82	0.04	0.39	0.96	
Uniform Delay, d1	38.8	15.0	12.1	38.6	19.0	11.7	31.0	31.2	26.2	35.3	37.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	50.3	0.3	0.1	9.2	4.0	0.0	12.8	14.4	0.1	1.6	59.5	
Delay (s)	89.1	15.3	12.2	47.8	23.0	11.7	43.9	45.6	26.3	36.9	96.7	
Level of Service	F	B	B	D	C	B	D	D	C	D	F	
Approach Delay (s)		18.7			23.2			42.7			80.3	
Approach LOS		B			C			D			F	

Intersection Summary			
HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	81.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1733	1583	1770	1741	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1733	1583	1770	1741	
Volume (vph)	130	933	190	24	1028	48	240	101	54	51	129	99
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	134	962	196	25	1060	49	247	104	56	53	133	102
RTOR Reduction (vph)	0	0	107	0	0	29	0	0	47	0	30	0
Lane Group Flow (vph)	134	962	89	25	1060	20	171	180	9	53	205	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2	35.3	35.3	2.1	31.2	31.2	12.6	12.6	12.6	11.6	11.6	
Effective Green, g (s)	6.2	35.3	35.3	2.1	31.2	31.2	12.6	12.6	12.6	11.6	11.6	
Actuated g/C Ratio	0.08	0.45	0.45	0.03	0.40	0.40	0.16	0.16	0.16	0.15	0.15	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	141	1610	720	48	1423	636	273	281	257	265	260	
v/s Ratio Prot	c0.08	0.27		0.01	c0.30		0.10	c0.10		0.03	c0.12	
v/s Ratio Perm			0.06			0.01			0.01			
v/c Ratio	0.95	0.60	0.12	0.52	0.74	0.03	0.63	0.64	0.04	0.20	0.79	
Uniform Delay, d1	35.5	15.8	12.2	37.3	19.8	14.0	30.3	30.4	27.4	28.9	31.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	60.6	0.6	0.1	9.8	2.2	0.0	4.4	4.9	0.1	0.4	14.7	
Delay (s)	96.1	16.4	12.3	47.1	22.0	14.1	34.7	35.3	27.4	29.3	46.5	
Level of Service	F	B	B	D	C	B	C	D	C	C	D	
Approach Delay (s)		24.1			22.2			34.0			43.3	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1640	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1640	
Volume (vph)	68	1331	502	47	1047	55	51	142	262	93	51	204
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	1372	518	48	1079	57	53	146	270	96	53	210
RTOR Reduction (vph)	0	0	271	0	0	31	0	0	165	0	160	0
Lane Group Flow (vph)	70	1372	247	48	1079	26	53	146	105	96	103	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.1	35.2	35.2	2.0	33.1	33.1	11.3	11.3	11.3	9.3	9.3	
Effective Green, g (s)	4.1	35.2	35.2	2.0	33.1	33.1	11.3	11.3	11.3	9.3	9.3	
Actuated g/C Ratio	0.06	0.48	0.48	0.03	0.45	0.45	0.15	0.15	0.15	0.13	0.13	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	98	1688	755	48	1587	710	257	271	242	223	207	
v/s Ratio Prot	c0.04	c0.39		0.03	0.30		0.03	c0.08		0.05	c0.06	
v/s Ratio Perm			0.16			0.02			0.07			
v/c Ratio	0.71	0.81	0.33	1.00	0.68	0.04	0.21	0.54	0.43	0.43	0.50	
Uniform Delay, d1	34.3	16.5	12.0	35.9	16.1	11.4	27.3	28.8	28.3	29.8	30.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.8	3.1	0.3	129.9	1.2	0.0	0.4	2.1	1.2	1.3	1.9	
Delay (s)	56.0	19.6	12.2	165.8	17.3	11.4	27.7	30.9	29.6	31.1	32.0	
Level of Service	E	B	B	F	B	B	C	C	C	C	C	
Approach Delay (s)		18.9			23.1			29.8			31.7	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	73.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	201	21	143	985	1143	226
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	209	22	149	1026	1191	235
RTOR Reduction (vph)	0	18	0	0	0	114
Lane Group Flow (vph)	209	4	149	1026	1191	121
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.9	12.9	9.1	48.9	35.8	35.8
Effective Green, g (s)	12.9	12.9	9.1	48.9	35.8	35.8
Actuated g/C Ratio	0.18	0.18	0.13	0.70	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	327	293	231	2479	1815	812
v/s Ratio Prot	c0.12		c0.08	0.29	c0.34	
v/s Ratio Perm		0.00				0.08
v/c Ratio	0.64	0.01	0.65	0.41	0.66	0.15
Uniform Delay, d1	26.3	23.3	28.8	4.4	12.5	9.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	0.0	6.1	0.1	0.9	0.1
Delay (s)	30.4	23.3	34.9	4.5	13.3	9.0
Level of Service	C	C	C	A	B	A
Approach Delay (s)	29.7			8.4	12.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	220	48	96	932	1133	227
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	244	53	107	1036	1259	252
RTOR Reduction (vph)	0	43	0	0	0	122
Lane Group Flow (vph)	244	10	107	1036	1259	130
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	13.8	13.8	8.1	48.0	35.9	35.9
Effective Green, g (s)	13.8	13.8	8.1	48.0	35.9	35.9
Actuated g/C Ratio	0.20	0.20	0.12	0.69	0.51	0.51
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	350	313	205	2434	1820	814
v/s Ratio Prot	c0.14		c0.06	0.29	c0.36	
v/s Ratio Perm		0.01				0.08
v/c Ratio	0.70	0.03	0.52	0.43	0.69	0.16
Uniform Delay, d1	26.1	22.6	29.0	4.8	12.8	9.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.9	0.0	2.4	0.1	1.2	0.1
Delay (s)	32.0	22.7	31.4	4.9	13.9	9.1
Level of Service	C	C	C	A	B	A
Approach Delay (s)	30.3			7.4	13.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	243	91	62	1461	1321	270
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	253	95	65	1522	1376	281
RTOR Reduction (vph)	0	75	0	0	0	125
Lane Group Flow (vph)	253	20	65	1522	1376	156
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.7	14.7	4.6	47.4	38.8	38.8
Effective Green, g (s)	14.7	14.7	4.6	47.4	38.8	38.8
Actuated g/C Ratio	0.21	0.21	0.07	0.68	0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	371	332	116	2393	1959	876
v/s Ratio Prot	c0.14		0.04	c0.43	c0.39	
v/s Ratio Perm		0.01				0.10
v/c Ratio	0.68	0.06	0.56	0.64	0.70	0.18
Uniform Delay, d1	25.5	22.2	31.8	6.4	11.4	7.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.1	6.1	0.6	1.2	0.1
Delay (s)	30.6	22.2	37.8	7.0	12.6	7.8
Level of Service	C	C	D	A	B	A
Approach Delay (s)	28.4			8.3	11.8	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	70.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Volume (vph)	61	885	99	45	956	1159	36	116	8	1065	140	104
Peak-hour factor, PHF	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. Flow (vph)	61	885	99	45	956	1159	36	116	8	1065	140	104
RTOR Reduction (vph)	0	0	68	0	0	0	0	0	8	0	0	62
Lane Group Flow (vph)	61	885	31	45	956	1159	36	116	0	587	618	42
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	2.8	26.0	26.0	2.1	25.3	81.9	5.0	5.0	5.0	32.8	32.8	32.8
Effective Green, g (s)	2.8	26.0	26.0	2.1	25.3	81.9	5.0	5.0	5.0	32.8	32.8	32.8
Actuated g/C Ratio	0.03	0.32	0.32	0.03	0.31	1.00	0.06	0.06	0.06	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	61	1123	503	45	1093	1583	108	114	97	673	682	634
v/s Ratio Prot	0.03	0.25		0.03	c0.27		0.02	0.06		0.35	c0.36	
v/s Ratio Perm			0.02			c0.73			0.00			0.03
v/c Ratio	1.00	0.79	0.06	1.00	0.87	0.73	0.33	1.02	0.01	0.87	0.91	0.07
Uniform Delay, d1	39.6	25.4	19.5	39.9	26.8	0.0	36.9	38.5	36.1	22.6	23.1	15.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	115.2	3.7	0.1	134.2	8.0	3.0	1.8	89.1	0.0	12.0	15.6	0.0
Delay (s)	154.8	29.2	19.5	174.1	34.8	3.0	38.7	127.5	36.1	34.6	38.7	15.2
Level of Service	F	C	B	F	C	A	D	F	D	C	D	B
Approach Delay (s)		35.6			20.6			103.0			35.0	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	81.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1702	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1702	1583
Volume (vph)	55	731	47	80	817	947	47	66	14	1170	142	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	746	48	82	834	966	48	67	14	1194	145	87
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	13	0	0	49
Lane Group Flow (vph)	56	746	13	82	834	966	48	67	1	652	687	38
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	3.6	22.2	22.2	4.3	22.9	81.5	3.6	3.6	3.6	35.4	35.4	35.4
Effective Green, g (s)	3.6	22.2	22.2	4.3	22.9	81.5	3.6	3.6	3.6	35.4	35.4	35.4
Actuated g/C Ratio	0.04	0.27	0.27	0.05	0.28	1.00	0.04	0.04	0.04	0.43	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	78	964	431	93	994	1583	78	82	70	730	739	688
v/s Ratio Prot	0.03	0.21		0.05	c0.24		0.03	0.04		0.39	c0.40	
v/s Ratio Perm			0.01			c0.61			0.00			0.02
v/c Ratio	0.72	0.77	0.03	0.88	0.84	0.61	0.62	0.82	0.01	0.89	0.93	0.05
Uniform Delay, d1	38.4	27.3	21.8	38.3	27.6	0.0	38.3	38.6	37.2	21.3	21.9	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.9	3.9	0.0	56.5	6.3	1.8	13.6	44.3	0.1	13.3	17.9	0.0
Delay (s)	65.3	31.3	21.8	94.9	33.9	1.8	51.8	83.0	37.3	34.6	39.8	13.4
Level of Service	E	C	C	F	C	A	D	F	D	C	D	B
Approach Delay (s)		33.0			20.1			66.4			35.8	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	4.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Volume (vph)	71	1152	135	80	725	1317	68	161	39	1074	177	162
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	72	1164	136	81	732	1330	69	163	39	1085	179	164
RTOR Reduction (vph)	0	0	91	0	0	0	0	0	36	0	0	104
Lane Group Flow (vph)	72	1164	45	81	732	1330	69	163	3	616	648	60
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Effective Green, g (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Actuated g/C Ratio	0.05	0.33	0.33	0.04	0.32	1.00	0.09	0.09	0.09	0.36	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	1161	520	78	1130	1583	156	164	139	611	621	575
v/s Ratio Prot	0.04	c0.33		0.05	0.21		0.04	0.09		0.37	c0.38	
v/s Ratio Perm			0.03			c0.84			0.00			0.04
v/c Ratio	0.77	1.00	0.09	1.04	0.65	0.84	0.44	0.99	0.02	1.01	1.04	0.10
Uniform Delay, d1	42.4	30.5	21.1	43.4	26.5	0.0	39.3	41.4	37.8	28.9	28.9	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.4	27.0	0.1	112.9	1.3	5.5	2.0	68.1	0.1	38.4	48.0	0.1
Delay (s)	72.8	57.5	21.2	156.3	27.8	5.5	41.3	109.5	37.9	67.3	76.9	19.2
Level of Service	E	E	C	F	C	A	D	F	D	E	E	B
Approach Delay (s)		54.7			18.8			81.8			66.1	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	44.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.98		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4823		1770	5076		1681	1670		1770	1710	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4823		1770	5076		1681	1670		1770	1710	
Volume (vph)	39	1301	683	70	1565	19	571	22	38	24	19	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	40	1328	697	71	1597	19	583	22	39	24	19	23
RTOR Reduction (vph)	0	100	0	0	1	0	0	5	0	0	22	0
Lane Group Flow (vph)	40	1925	0	71	1615	0	327	312	0	24	20	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	3.1	38.6		5.0	40.5		18.1	18.1		2.6	2.6	
Effective Green, g (s)	3.1	38.6		5.0	40.5		18.1	18.1		2.6	2.6	
Actuated g/C Ratio	0.04	0.48		0.06	0.50		0.23	0.23		0.03	0.03	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	2318		110	2560		379	376		57	55	
v/s Ratio Prot	0.02	c0.40		c0.04	0.32		c0.19	0.19		c0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.59	0.83		0.65	0.63		0.86	0.83		0.42	0.36	
Uniform Delay, d1	38.0	18.0		36.8	14.5		29.9	29.6		38.1	38.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.3	2.7		12.3	0.5		18.0	14.0		5.0	4.0	
Delay (s)	50.3	20.7		49.1	15.0		47.9	43.6		43.1	42.0	
Level of Service	D	C		D	B		D	D		D	D	
Approach Delay (s)		21.3			16.4			45.8			42.4	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	80.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.97		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.97		0.95	1.00	
Satd. Flow (prot)	1770	4793		1770	5067		1681	1659		1770	1720	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.97		0.95	1.00	
Satd. Flow (perm)	1770	4793		1770	5067		1681	1659		1770	1720	
Volume (vph)	57	1097	681	72	1544	39	584	58	81	50	41	43
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	61	1167	724	77	1643	41	621	62	86	53	44	46
RTOR Reduction (vph)	0	121	0	0	2	0	0	11	0	0	42	0
Lane Group Flow (vph)	61	1770	0	77	1682	0	386	372	0	53	48	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	6.6	34.8		4.4	32.6		18.1	18.1		6.4	6.4	
Effective Green, g (s)	6.6	34.8		4.4	32.6		18.1	18.1		6.4	6.4	
Actuated g/C Ratio	0.08	0.44		0.06	0.41		0.23	0.23		0.08	0.08	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	147	2093		98	2073		382	377		142	138	
v/s Ratio Prot	0.03	c0.37		c0.04	0.33		c0.23	0.22		c0.03	0.03	
v/s Ratio Perm												
v/c Ratio	0.41	0.88dr		0.79	0.81		1.01	0.99		0.37	0.35	
Uniform Delay, d1	34.7	20.1		37.2	20.8		30.8	30.7		34.7	34.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	3.3		32.8	2.5		48.7	42.5		1.7	1.5	
Delay (s)	36.6	23.4		70.0	23.4		79.5	73.2		36.4	36.2	
Level of Service	D	C		E	C		E	E		D	D	
Approach Delay (s)		23.8			25.4			76.4			36.3	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4845		1770	5081		1681	1666		1770	1745	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4845		1770	5081		1681	1666		1770	1745	
Volume (vph)	24	1523	699	45	1262	8	875	10	54	28	28	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	24	1554	713	46	1288	8	893	10	55	29	29	21
RTOR Reduction (vph)	0	88	0	0	1	0	0	5	0	0	20	0
Lane Group Flow (vph)	24	2179	0	46	1295	0	495	458	0	29	30	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Effective Green, g (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Actuated g/C Ratio	0.02	0.47		0.03	0.48		0.27	0.27		0.04	0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	38	2263		56	2425		462	458		78	77	
v/s Ratio Prot	0.01	c0.45		c0.03	0.25		c0.29	0.27		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.63	0.96		0.82	0.53		1.07	1.00		0.37	0.39	
Uniform Delay, d1	42.7	22.7		42.4	16.1		31.9	31.9		40.9	40.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.5	11.4		60.2	0.2		62.3	41.7		3.0	3.2	
Delay (s)	72.2	34.1		102.5	16.4		94.2	73.6		43.8	44.1	
Level of Service	E	C		F	B		F	E		D	D	
Approach Delay (s)		34.5			19.3			84.2			44.0	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Volume (vph)	59	368	195	104	302	105	182	764	126	111	721	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	387	205	109	318	111	192	804	133	117	759	93
RTOR Reduction (vph)	0	0	148	0	0	77	0	0	89	0	10	0
Lane Group Flow (vph)	62	387	57	109	318	34	192	804	44	117	842	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.7	24.7	7.5	23.0	
Effective Green, g (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.7	24.7	7.5	23.0	
Actuated g/C Ratio	0.05	0.28	0.28	0.08	0.31	0.31	0.12	0.33	0.33	0.10	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	94	521	443	143	573	487	216	1159	519	176	1062	
v/s Ratio Prot	0.04	c0.21		c0.06	0.17		c0.11	0.23		0.07	c0.24	
v/s Ratio Perm			0.04			0.02			0.03			
v/c Ratio	0.66	0.74	0.13	0.76	0.55	0.07	0.89	0.69	0.08	0.66	0.79	
Uniform Delay, d1	35.0	24.7	20.3	33.9	21.8	18.5	32.6	22.1	17.5	32.7	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	5.7	0.1	21.0	1.2	0.1	32.6	1.8	0.1	9.1	4.1	
Delay (s)	50.5	30.4	20.4	55.0	23.0	18.5	65.2	23.9	17.6	41.8	28.1	
Level of Service	D	C	C	D	C	B	E	C	B	D	C	
Approach Delay (s)		29.2			28.5			30.2			29.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3498	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3498	
Volume (vph)	81	271	174	91	277	155	147	824	92	117	883	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	82	274	176	92	280	157	148	832	93	118	892	75
RTOR Reduction (vph)	0	0	142	0	0	125	0	0	52	0	6	0
Lane Group Flow (vph)	82	274	34	92	280	32	148	832	41	118	961	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Effective Green, g (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Actuated g/C Ratio	0.06	0.19	0.19	0.07	0.20	0.20	0.11	0.44	0.44	0.10	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	110	360	306	128	379	322	193	1559	698	173	1503	
v/s Ratio Prot	0.05	0.15		c0.05	c0.15		c0.08	0.24		0.07	c0.27	
v/s Ratio Perm			0.02			0.02			0.03			
v/c Ratio	0.75	0.76	0.11	0.72	0.74	0.10	0.77	0.53	0.06	0.68	0.64	
Uniform Delay, d1	37.7	31.2	27.2	37.1	30.5	26.5	35.4	16.7	13.1	35.6	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.7	9.2	0.2	17.5	7.4	0.1	16.5	1.3	0.2	10.6	2.1	
Delay (s)	61.3	40.3	27.3	54.6	37.9	26.6	51.9	18.0	13.3	46.2	20.4	
Level of Service	E	D	C	D	D	C	D	B	B	D	C	
Approach Delay (s)		39.3			37.4			22.3			23.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3440	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3440	
Volume (vph)	141	496	159	40	364	236	135	595	111	199	698	161
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	142	501	161	40	368	238	136	601	112	201	705	163
RTOR Reduction (vph)	0	0	104	0	0	171	0	0	80	0	22	0
Lane Group Flow (vph)	142	501	57	40	368	67	136	601	32	201	846	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.2	21.2	9.3	23.2	
Effective Green, g (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.2	21.2	9.3	23.2	
Actuated g/C Ratio	0.10	0.35	0.35	0.03	0.28	0.28	0.10	0.28	0.28	0.12	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	658	559	47	524	445	172	1000	447	219	1064	
v/s Ratio Prot	c0.08	c0.27		0.02	0.20		0.08	0.17		c0.11	c0.25	
v/s Ratio Perm			0.04			0.04			0.02			
v/c Ratio	0.81	0.76	0.10	0.85	0.70	0.15	0.79	0.60	0.07	0.92	0.80	
Uniform Delay, d1	33.1	21.5	16.3	36.4	24.1	20.2	33.1	23.2	19.7	32.5	23.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.0	5.2	0.1	77.3	4.2	0.2	21.4	1.0	0.1	38.5	4.2	
Delay (s)	57.1	26.6	16.3	113.6	28.4	20.4	54.5	24.3	19.8	71.0	27.9	
Level of Service	E	C	B	F	C	C	D	C	B	E	C	
Approach Delay (s)		30.0			30.7			28.5			36.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	133	586	161	262	587	204	175	1127	527	329	953	116
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	140	617	169	276	618	215	184	1186	555	346	1003	122
RTOR Reduction (vph)	0	0	139	0	0	174	0	0	162	0	0	71
Lane Group Flow (vph)	140	617	30	276	618	41	184	1186	393	346	1003	51
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Effective Green, g (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Actuated g/C Ratio	0.08	0.18	0.18	0.09	0.19	0.19	0.14	0.36	0.36	0.20	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	629	281	305	668	299	240	1258	563	354	1486	665
v/s Ratio Prot	0.08	0.17		c0.08	c0.17		0.10	c0.34		c0.20	0.28	
v/s Ratio Perm			0.02			0.03			0.25			0.03
v/c Ratio	1.01	0.98	0.11	0.90	0.93	0.14	0.77	0.94	0.70	0.98	0.67	0.08
Uniform Delay, d1	41.5	36.8	31.0	40.6	35.9	30.4	37.5	28.1	24.9	35.8	21.1	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.5	30.9	0.2	28.4	18.7	0.2	13.6	13.9	3.8	41.3	1.2	0.0
Delay (s)	122.0	67.8	31.2	69.0	54.6	30.6	51.1	42.0	28.6	77.1	22.4	15.7
Level of Service	F	E	C	E	D	C	D	D	C	E	C	B
Approach Delay (s)		69.3			53.5			39.0			34.7	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	128	594	138	196	573	168	105	1091	520	363	1059	119
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	606	141	200	585	171	107	1113	531	370	1081	121
RTOR Reduction (vph)	0	0	115	0	0	141	0	0	149	0	0	64
Lane Group Flow (vph)	131	606	26	200	585	30	107	1113	382	370	1081	57
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.7	31.7	31.7	20.0	43.0	43.0
Effective Green, g (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.7	31.7	31.7	20.0	43.0	43.0
Actuated g/C Ratio	0.08	0.19	0.19	0.07	0.18	0.18	0.10	0.35	0.35	0.22	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	663	297	227	624	279	170	1237	553	390	1678	750
v/s Ratio Prot	c0.07	c0.17		0.06	0.17		0.06	c0.31		c0.21	0.31	
v/s Ratio Perm			0.02			0.02			0.24			0.04
v/c Ratio	0.96	0.91	0.09	0.88	0.94	0.11	0.63	0.90	0.69	0.95	0.64	0.08
Uniform Delay, d1	41.7	36.1	30.5	42.0	36.9	31.4	39.4	28.0	25.3	34.8	18.1	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.9	17.1	0.1	30.3	21.7	0.2	7.1	9.0	3.7	32.2	0.9	0.0
Delay (s)	104.6	53.3	30.6	72.3	58.5	31.5	46.6	37.0	29.0	67.1	18.9	13.1
Level of Service	F	D	C	E	E	C	D	D	C	E	B	B
Approach Delay (s)		57.3			56.6			35.1			29.8	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	154	608	63	714	686	199	112	892	439	473	580	144
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	661	68	776	746	216	122	970	477	514	630	157
RTOR Reduction (vph)	0	0	57	0	0	163	0	0	261	0	0	100
Lane Group Flow (vph)	167	661	11	776	746	53	122	970	216	514	630	57
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Effective Green, g (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Actuated g/C Ratio	0.10	0.16	0.16	0.19	0.24	0.24	0.12	0.24	0.24	0.23	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	551	246	648	865	387	205	865	387	413	1282	573
v/s Ratio Prot	0.09	c0.19		c0.23	0.21		0.07	c0.27		c0.29	0.18	
v/s Ratio Perm			0.01			0.03			0.14			0.04
v/c Ratio	0.94	1.20	0.04	1.20	0.86	0.14	0.60	1.12	0.56	1.24	0.49	0.10
Uniform Delay, d1	40.2	38.0	32.3	36.5	32.6	26.6	37.8	34.0	29.8	34.5	22.3	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	51.0	106.4	0.1	103.4	8.9	0.2	4.6	69.7	1.8	129.0	0.3	0.1
Delay (s)	91.3	144.4	32.4	139.9	41.4	26.7	42.4	103.7	31.5	163.5	22.6	19.1
Level of Service	F	F	C	F	D	C	D	F	C	F	C	B
Approach Delay (s)		126.0			83.5			77.0			77.8	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	87.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4968		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4968		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	84	622	113	604	1345	200	165	527	536	191	587	104
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	635	115	616	1372	204	168	538	547	195	599	106
RTOR Reduction (vph)	0	29	0	0	0	117	0	0	40	0	0	84
Lane Group Flow (vph)	86	721	0	616	1372	87	168	538	507	195	599	22
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	4.5	20.3		20.1	35.9	35.9	9.8	16.3	36.4	11.3	17.8	17.8
Effective Green, g (s)	4.5	20.3		20.1	35.9	35.9	9.8	16.3	36.4	11.3	17.8	17.8
Actuated g/C Ratio	0.05	0.24		0.24	0.43	0.43	0.12	0.19	0.43	0.13	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	95	1201		821	1513	677	207	687	761	238	750	335
v/s Ratio Prot	0.05	0.15		0.18	c0.39		0.09	0.15	c0.16	c0.11	c0.17	
v/s Ratio Perm						0.06			0.16			0.01
v/c Ratio	0.91	0.60		0.75	0.91	0.13	0.81	0.78	0.67	0.82	0.80	0.07
Uniform Delay, d1	39.5	28.3		29.6	22.5	14.6	36.2	32.2	19.0	35.4	31.4	26.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.0	0.9		3.9	8.1	0.1	20.9	5.8	2.2	19.3	5.9	0.1
Delay (s)	101.5	29.1		33.5	30.6	14.7	57.1	38.0	21.2	54.6	37.4	26.5
Level of Service	F	C		C	C	B	E	D	C	D	D	C
Approach Delay (s)		36.6			30.0			33.2			39.8	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4989		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4989		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	50	652	94	497	1068	126	103	551	453	108	487	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	686	99	523	1124	133	108	580	477	114	513	65
RTOR Reduction (vph)	0	20	0	0	0	75	0	0	70	0	0	50
Lane Group Flow (vph)	53	765	0	523	1124	58	108	580	407	114	513	15
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	2.5	19.5		16.6	33.6	33.6	7.2	17.1	33.7	7.3	17.2	17.2
Effective Green, g (s)	2.5	19.5		16.6	33.6	33.6	7.2	17.1	33.7	7.3	17.2	17.2
Actuated g/C Ratio	0.03	0.25		0.22	0.44	0.44	0.09	0.22	0.44	0.10	0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	58	1272		745	1554	695	167	791	780	169	796	356
v/s Ratio Prot	0.03	0.15		c0.15	c0.32		0.06	c0.16	c0.11	c0.06	0.14	
v/s Ratio Perm						0.04			0.14			0.01
v/c Ratio	0.91	0.60		0.70	0.72	0.08	0.65	0.73	0.52	0.67	0.64	0.04
Uniform Delay, d1	36.9	25.1		27.7	17.6	12.5	33.4	27.6	15.5	33.5	26.9	23.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	86.9	0.8		3.0	1.7	0.1	8.3	3.5	0.6	10.2	1.8	0.0
Delay (s)	123.8	25.9		30.7	19.3	12.5	41.7	31.1	16.2	43.6	28.7	23.2
Level of Service	F	C		C	B	B	D	C	B	D	C	C
Approach Delay (s)		32.1			22.2			26.0			30.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4979		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4979		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	121	1309	212	480	874	151	129	604	729	115	636	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	122	1322	214	485	883	153	130	610	736	116	642	75
RTOR Reduction (vph)	0	25	0	0	0	89	0	0	12	0	0	59
Lane Group Flow (vph)	122	1511	0	485	883	64	130	610	724	116	642	16
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Effective Green, g (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Actuated g/C Ratio	0.12	0.31		0.22	0.42	0.42	0.08	0.22	0.44	0.07	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	204	1558		767	1491	667	138	771	769	119	732	327
v/s Ratio Prot	0.07	c0.30		0.14	0.25		c0.07	0.17	c0.21	0.07	0.18	
v/s Ratio Perm						0.04			0.25			0.01
v/c Ratio	0.60	0.97		0.63	0.59	0.10	0.94	0.79	0.94	0.97	0.88	0.05
Uniform Delay, d1	37.6	30.3		31.4	20.0	15.6	41.0	33.1	23.9	41.7	34.4	28.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	16.2		1.7	0.6	0.1	58.8	5.6	19.5	74.0	11.5	0.1
Delay (s)	42.3	46.5		33.1	20.6	15.7	99.9	38.6	43.4	115.7	45.9	28.5
Level of Service	D	D		C	C	B	F	D	D	F	D	C
Approach Delay (s)		46.2			24.1			46.4			54.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	449	829	1621	0	0	381
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	454	837	1637	0	0	385
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1637				2963	819
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1637				2963	819
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	0
cM capacity (veh/h)	392				0	319

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	454	419	419	819	819	385
Volume Left	454	0	0	0	0	0
Volume Right	0	0	0	0	0	385
cSH	392	1700	1700	1700	1700	319
Volume to Capacity	1.16	0.25	0.25	0.48	0.48	1.21
Queue Length 95th (ft)	436	0	0	0	0	421
Control Delay (s)	127.3	0.0	0.0	0.0	0.0	154.2
Lane LOS	F					F
Approach Delay (s)	44.7			0.0		154.2
Approach LOS						F

Intersection Summary			
Average Delay	35.3		
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	490	946	1320	0	0	351
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	495	956	1333	0	0	355
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1333				2801	667
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1333				2801	667
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	4				100	12
cM capacity (veh/h)	513				1	402

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	495	478	478	667	667	355
Volume Left	495	0	0	0	0	0
Volume Right	0	0	0	0	0	355
cSH	513	1700	1700	1700	1700	402
Volume to Capacity	0.96	0.28	0.28	0.39	0.39	0.88
Queue Length 95th (ft)	313	0	0	0	0	224
Control Delay (s)	59.7	0.0	0.0	0.0	0.0	52.9
Lane LOS	F					F
Approach Delay (s)	20.4			0.0		52.9
Approach LOS						F

Intersection Summary			
Average Delay	15.4		
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	573	1583	1095	0	0	478
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	591	1632	1129	0	0	493
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1129				3126	564
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129				3126	564
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	4				100	0
cM capacity (veh/h)	615				0	469

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	591	816	816	564	564	493
Volume Left	591	0	0	0	0	0
Volume Right	0	0	0	0	0	493
cSH	615	1700	1700	1700	1700	469
Volume to Capacity	0.96	0.48	0.48	0.33	0.33	1.05
Queue Length 95th (ft)	337	0	0	0	0	380
Control Delay (s)	53.2	0.0	0.0	0.0	0.0	85.7
Lane LOS	F					F
Approach Delay (s)	14.1			0.0		85.7
Approach LOS						F

Intersection Summary			
Average Delay	19.2		
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3509		3433	3539	1583		1827	1583		2916	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3509		3433	3539	1583		1827	1583		2916	1346
Volume (vph)	0	944	57	296	1372	146	101	158	233	130	75	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	983	59	308	1429	152	105	165	243	135	78	21
RTOR Reduction (vph)	0	5	0	0	0	56	0	0	210	0	0	19
Lane Group Flow (vph)	0	1037	0	308	1429	96	0	270	33	0	213	2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		Over	Split		Perm
Protected Phases		4		3	8		6	6	3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		27.9		10.8	42.7	42.7		15.8	10.8		9.3	9.3
Effective Green, g (s)		27.9		10.8	42.7	42.7		15.8	10.8		9.3	9.3
Actuated g/C Ratio		0.35		0.14	0.54	0.54		0.20	0.14		0.12	0.12
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1227		465	1894	847		362	214		340	157
v/s Ratio Prot		c0.30		0.09	c0.40			c0.15	0.02		c0.07	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.85		0.66	0.75	0.11		0.75	0.15		0.63	0.02
Uniform Delay, d1		24.0		32.8	14.5	9.2		30.1	30.5		33.6	31.2
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.5		3.5	1.8	0.1		8.1	0.3		3.6	0.0
Delay (s)		29.5		36.3	16.2	9.2		38.2	30.8		37.2	31.2
Level of Service		C		D	B	A		D	C		D	C
Approach Delay (s)		29.5			18.9			34.7			36.6	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3512		3433	3539	1583		1834	1583		2924	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3512		3433	3539	1583		1834	1583		2924	1346
Volume (vph)	0	950	51	289	1248	162	63	135	284	166	121	33
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	990	53	301	1300	169	66	141	296	173	126	34
RTOR Reduction (vph)	0	5	0	0	0	68	0	0	62	0	0	29
Lane Group Flow (vph)	0	1038	0	301	1300	101	0	207	234	0	299	5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		27.9		10.3	42.2	42.2		13.3	27.6		12.1	12.1
Effective Green, g (s)		27.9		10.3	42.2	42.2		13.3	27.6		12.1	12.1
Actuated g/C Ratio		0.35		0.13	0.53	0.53		0.17	0.35		0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1231		444	1876	839		306	549		444	205
v/s Ratio Prot		c0.30		0.09	c0.37			c0.11	0.15		c0.10	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.84		0.68	0.69	0.12		0.68	0.43		0.67	0.03
Uniform Delay, d1		23.8		33.1	13.9	9.4		31.1	19.9		31.9	28.7
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		5.4		4.1	1.1	0.1		5.8	0.5		4.0	0.0
Delay (s)		29.3		37.2	15.0	9.4		36.9	20.5		35.9	28.8
Level of Service		C		D	B	A		D	C		D	C
Approach Delay (s)		29.3			18.2			27.2			35.2	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3513		3433	3539	1583		1833	1583		3192	1468
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3513		3433	3539	1583		1833	1583		3192	1468
Volume (vph)	0	1437	74	366	1035	173	93	195	500	204	157	35
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1466	76	373	1056	177	95	199	510	208	160	36
RTOR Reduction (vph)	0	4	0	0	0	75	0	0	13	0	0	32
Lane Group Flow (vph)	0	1538	0	373	1056	102	0	294	497	0	368	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	10%	10%	10%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		37.0		11.0	52.0	52.0		17.0	32.0		9.0	9.0
Effective Green, g (s)		37.0		11.0	52.0	52.0		17.0	32.0		9.0	9.0
Actuated g/C Ratio		0.41		0.12	0.58	0.58		0.19	0.36		0.10	0.10
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1444		420	2045	915		346	563		319	147
v/s Ratio Prot		c0.44		0.11	0.30			0.16	c0.31		c0.12	
v/s Ratio Perm						0.06						0.00
v/c Ratio		1.07		0.89	0.52	0.11		0.85	0.88		1.27dl	0.02
Uniform Delay, d1		26.5		38.9	11.4	8.6		35.3	27.2		40.5	36.5
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		43.1		19.7	0.2	0.1		17.4	15.1		98.8	0.1
Delay (s)		69.6		58.6	11.7	8.6		52.7	42.4		139.3	36.6
Level of Service		E		E	B	A		D	D		F	D
Approach Delay (s)		69.6			22.2			46.1			130.1	
Approach LOS		E			C			D			F	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	182	1022	1512	11	0	156
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	186	1043	1543	11	0	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.65				0.70	0.65
vC, conflicting volume	1554				2441	777
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1309				2130	105
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	45				100	73
cM capacity (veh/h)	339				14	599

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	186	521	521	1029	526	159
Volume Left	186	0	0	0	0	0
Volume Right	0	0	0	0	11	159
cSH	339	1700	1700	1700	1700	599
Volume to Capacity	0.55	0.31	0.31	0.61	0.31	0.27
Queue Length 95th (ft)	78	0	0	0	0	27
Control Delay (s)	27.8	0.0	0.0	0.0	0.0	13.2
Lane LOS	D					B
Approach Delay (s)	4.2			0.0		13.2
Approach LOS						B

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	176	1102	1407	15	0	164
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	185	1160	1481	16	0	173
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.71				0.76	0.71
vC, conflicting volume	1497				2439	748
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1286				2114	225
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	51				100	69
cM capacity (veh/h)	377				17	549

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	185	580	580	987	509	173
Volume Left	185	0	0	0	0	0
Volume Right	0	0	0	0	16	173
cSH	377	1700	1700	1700	1700	549
Volume to Capacity	0.49	0.34	0.34	0.58	0.30	0.31
Queue Length 95th (ft)	65	0	0	0	0	33
Control Delay (s)	23.4	0.0	0.0	0.0	0.0	14.5
Lane LOS	C					B
Approach Delay (s)	3.2			0.0		14.5
Approach LOS						B

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

11: Ka'ahumanu Av & Hana Hwy

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	130	1493	1225	9	0	181
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	131	1508	1237	9	0	183
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		657	984			
pX, platoon unblocked	0.83				0.78	0.83
vC, conflicting volume	1246				2259	623
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1089				1667	335
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	75				100	67
cM capacity (veh/h)	526				51	546

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	131	754	754	825	422	183
Volume Left	131	0	0	0	0	0
Volume Right	0	0	0	0	9	183
cSH	526	1700	1700	1700	1700	546
Volume to Capacity	0.25	0.44	0.44	0.49	0.25	0.33
Queue Length 95th (ft)	24	0	0	0	0	37
Control Delay (s)	14.1	0.0	0.0	0.0	0.0	14.9
Lane LOS	B					B
Approach Delay (s)	1.1			0.0		14.9
Approach LOS						B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

12: Ka'ahumanu Av & Hobron Av

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	149	44	26	271	201	121
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	175	52	31	319	236	142
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	616	236	379			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	616	236	379			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	60	94	97			
cM capacity (veh/h)	442	803	1180			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	175	52	349	236	142
Volume Left	175	0	31	0	0
Volume Right	0	52	0	0	142
cSH	442	803	1180	1700	1700
Volume to Capacity	0.40	0.06	0.03	0.14	0.08
Queue Length 95th (ft)	47	5	2	0	0
Control Delay (s)	18.4	9.8	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	16.4		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	163	28	25	296	244	143
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	181	31	28	329	271	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	656	271	430			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	656	271	430			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	57	96	98			
cM capacity (veh/h)	420	768	1129			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	181	31	357	271	159
Volume Left	181	0	28	0	0
Volume Right	0	31	0	0	159
cSH	420	768	1129	1700	1700
Volume to Capacity	0.43	0.04	0.02	0.16	0.09
Queue Length 95th (ft)	53	3	2	0	0
Control Delay (s)	19.9	9.9	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	18.4		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	108	32	48	330	356	189
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	135	40	60	412	445	236
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked	0.98					
vC, conflicting volume	978	445	681			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	977	445	681			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	47	93	93			
cM capacity (veh/h)	254	613	911			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	135	40	472	445	236
Volume Left	135	0	60	0	0
Volume Right	0	40	0	0	236
cSH	254	613	911	1700	1700
Volume to Capacity	0.53	0.07	0.07	0.26	0.14
Queue Length 95th (ft)	72	5	5	0	0
Control Delay (s)	34.3	11.3	1.9	0.0	0.0
Lane LOS	D	B	A		
Approach Delay (s)	29.0		1.9	0.0	
Approach LOS	D				

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	7	179	0	1	4	163	214	12	172	2
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	8	211	0	1	4	192	252	14	202	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	433	684	203	566	559	318	205			444		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	433	684	203	566	559	318	205			444		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	51	100	100	100			99		
cM capacity (veh/h)	525	365	837	426	431	723	1367			1117		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	9	212	4	444	219
Volume Left	1	211	4	0	14
Volume Right	8	1	0	252	2
cSH	779	427	1367	1700	1117
Volume to Capacity	0.01	0.50	0.00	0.26	0.01
Queue Length 95th (ft)	1	67	0	0	1
Control Delay (s)	9.7	21.4	7.6	0.0	0.6
Lane LOS	A	C	A		A
Approach Delay (s)	9.7	21.4	0.1		0.6
Approach LOS	A	C			

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	12	188	0	9	5	180	265	17	184	1
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	13	221	0	11	5	212	312	20	216	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	490	791	217	649	636	368	218			524		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	490	791	217	649	636	368	218			524		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	40	100	98	100			98		
cM capacity (veh/h)	472	314	823	370	386	678	1352			1043		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	14	232	5	524	238
Volume Left	1	221	5	0	20
Volume Right	13	11	0	312	1
cSH	778	378	1352	1700	1043
Volume to Capacity	0.02	0.61	0.00	0.31	0.02
Queue Length 95th (ft)	1	98	0	0	1
Control Delay (s)	9.7	28.5	7.7	0.0	0.9
Lane LOS	A	D	A		A
Approach Delay (s)	9.7	28.5	0.1		0.9
Approach LOS	A	D			

Intersection Summary			
Average Delay	6.9		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	2	7	270	0	2	7	209	268	6	263	3
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	0	2	8	303	0	2	8	235	301	7	296	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	561	860	296	718	713	385	299			536		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	561	860	296	718	713	385	299			536		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	10	100	100	99			99		
cM capacity (veh/h)	432	290	744	335	353	662	1262			1032		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	306	8	536	302	3
Volume Left	0	303	8	0	7	0
Volume Right	8	2	0	301	0	3
cSH	552	337	1262	1700	1032	1700
Volume to Capacity	0.02	0.91	0.01	0.32	0.01	0.00
Queue Length 95th (ft)	1	224	0	0	0	0
Control Delay (s)	11.6	64.3	7.9	0.0	0.3	0.0
Lane LOS	B	F	A		A	
Approach Delay (s)	11.6	64.3	0.1		0.3	
Approach LOS	B	F				

Intersection Summary			
Average Delay	17.1		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5069		1770	1619			1777	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.71	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5069		1351	1619			1326	1583
Volume (vph)	51	1199	82	64	1549	33	50	4	26	46	2	46
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	52	1223	84	65	1581	34	51	4	27	47	2	47
RTOR Reduction (vph)	0	0	28	0	1	0	0	25	0	0	0	43
Lane Group Flow (vph)	52	1223	56	65	1614	0	51	6	0	0	49	4
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.7	48.9	48.9	6.0	51.2		6.2	6.2			6.2	6.2
Effective Green, g (s)	3.7	48.9	48.9	6.0	51.2		6.2	6.2			6.2	6.2
Actuated g/C Ratio	0.05	0.67	0.67	0.08	0.70		0.08	0.08			0.08	0.08
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	90	2367	1059	145	3550		115	137			112	134
v/s Ratio Prot	0.03	c0.35		c0.04	0.32			0.00				
v/s Ratio Perm			0.04				c0.04				0.04	0.00
v/c Ratio	0.58	0.52	0.05	0.45	0.45		0.44	0.05			0.44	0.03
Uniform Delay, d1	33.9	6.1	4.2	32.0	4.8		31.8	30.7			31.8	30.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.7	0.2	0.0	2.2	0.1		2.7	0.1			2.7	0.1
Delay (s)	42.6	6.3	4.2	34.2	4.9		34.5	30.9			34.5	30.8
Level of Service	D	A	A	C	A		C	C			C	C
Approach Delay (s)		7.6			6.0			33.1			32.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	73.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5063		1770	1623			1777	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00			0.69	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5063		1328	1623			1286	1583
Volume (vph)	62	1066	99	79	1501	45	91	8	47	63	2	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	1122	104	83	1580	47	96	8	49	66	2	65
RTOR Reduction (vph)	0	0	37	0	2	0	0	44	0	0	0	58
Lane Group Flow (vph)	65	1122	67	83	1625	0	96	13	0	0	68	7
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	5.6	46.0	46.0	6.2	46.6		7.6	7.6			7.6	7.6
Effective Green, g (s)	5.6	46.0	46.0	6.2	46.6		7.6	7.6			7.6	7.6
Actuated g/C Ratio	0.08	0.64	0.64	0.09	0.65		0.11	0.11			0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	138	2267	1014	153	3286		141	172			136	168
v/s Ratio Prot	0.04	0.32		c0.05	c0.32			0.01				
v/s Ratio Perm			0.04				c0.07				0.05	0.00
v/c Ratio	0.47	0.49	0.07	0.54	0.49		0.68	0.08			0.50	0.04
Uniform Delay, d1	31.7	6.8	4.8	31.4	6.5		30.9	28.9			30.3	28.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.5	0.2	0.0	3.9	0.1		12.7	0.2			2.9	0.1
Delay (s)	34.2	7.0	4.9	35.3	6.6		43.6	29.1			33.2	28.9
Level of Service	C	A	A	D	A		D	C			C	C
Approach Delay (s)		8.2			8.0			38.2			31.1	
Approach LOS		A			A			D			C	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	71.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5073		1770	1598			1788	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.72	1.00			0.74	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5073		1345	1598			1385	1583
Volume (vph)	34	1452	124	97	1141	19	140	4	72	44	9	48
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	35	1482	127	99	1164	19	143	4	73	45	9	49
RTOR Reduction (vph)	0	0	52	0	1	0	0	61	0	0	0	41
Lane Group Flow (vph)	35	1482	75	99	1182	0	143	16	0	0	54	8
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	1.7	46.7	46.7	7.4	52.4		13.1	13.1			13.1	13.1
Effective Green, g (s)	1.7	46.7	46.7	7.4	52.4		13.1	13.1			13.1	13.1
Actuated g/C Ratio	0.02	0.59	0.59	0.09	0.66		0.17	0.17			0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	38	2087	933	165	3356		222	264			229	262
v/s Ratio Prot	0.02	c0.42		c0.06	0.23			0.01				
v/s Ratio Perm			0.05				c0.11				0.04	0.01
v/c Ratio	0.92	0.71	0.08	0.60	0.35		0.64	0.06			0.24	0.03
Uniform Delay, d1	38.7	11.5	7.0	34.5	5.9		30.9	27.9			28.7	27.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	114.3	1.2	0.0	5.8	0.1		6.3	0.1			0.5	0.0
Delay (s)	153.0	12.6	7.0	40.2	6.0		37.1	28.0			29.2	27.8
Level of Service	F	B	A	D	A		D	C			C	C
Approach Delay (s)		15.2			8.6			33.9			28.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	817	12	90	1613	19	8	21	26	2	10	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	842	12	93	1663	21	8	23	27	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1684			855			1871	2718	427	2308	2703	831
vC1, stage 1 conf vol							848	848		1848	1848	
vC2, stage 2 conf vol							1022	1869		459	855	
vCu, unblocked vol	1684			855			1871	2718	427	2308	2703	831
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			88			95	77	95	97	89	100
cM capacity (veh/h)	376			781			168	99	576	65	99	313

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	562	293	93	831	831	21	58	13
Volume Left	0	0	93	0	0	0	8	2
Volume Right	0	12	0	0	0	21	27	0
cSH	1700	1700	781	1700	1700	1700	178	91
Volume to Capacity	0.33	0.17	0.12	0.49	0.49	0.01	0.33	0.14
Queue Length 95th (ft)	0	0	10	0	0	0	33	12
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	0.0	34.7	51.0
Lane LOS			B				D	F
Approach Delay (s)	0.0		0.5				34.7	51.0
Approach LOS							D	F

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	55.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	897	49	71	1315	25	4	25	41	2	15	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	925	51	73	1356	27	4	27	42	2	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1383			975			1782	2479	488	2020	2477	678
vC1, stage 1 conf vol							950	950		1502	1502	
vC2, stage 2 conf vol							832	1529		518	975	
vCu, unblocked vol	1383			975			1782	2479	488	2020	2477	678
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			98	81	92	98	88	100
cM capacity (veh/h)	491			703			191	141	526	107	135	395

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	616	359	73	678	678	27	74	18
Volume Left	0	0	73	0	0	0	4	2
Volume Right	0	51	0	0	0	27	42	0
cSH	1700	1700	703	1700	1700	1700	249	131
Volume to Capacity	0.36	0.21	0.10	0.40	0.40	0.02	0.30	0.14
Queue Length 95th (ft)	0	0	9	0	0	0	30	12
Control Delay (s)	0.0	0.0	10.7	0.0	0.0	0.0	25.4	36.9
Lane LOS			B				D	E
Approach Delay (s)	0.0		0.5				25.4	36.9
Approach LOS							D	E

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1565	18	26	1076	27	19	16	34	2	11	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1613	19	27	1109	28	20	16	35	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1137			1632			2237	2813	816	2013	2795	555
vC1, stage 1 conf vol							1623	1623		1163	1163	
vC2, stage 2 conf vol							614	1191		850	1632	
vCu, unblocked vol	1137			1632			2237	2813	816	2013	2795	555
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			81	87	89	99	90	100
cM capacity (veh/h)	610			394			101	128	320	145	112	476

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	1076	556	27	555	555	28	71	13
Volume Left	0	0	27	0	0	0	20	2
Volume Right	0	19	0	0	0	28	35	0
cSH	1700	1700	394	1700	1700	1700	165	116
Volume to Capacity	0.63	0.33	0.07	0.33	0.33	0.02	0.43	0.12
Queue Length 95th (ft)	0	0	5	0	0	0	49	9
Control Delay (s)	0.0	0.0	14.8	0.0	0.0	0.0	42.6	39.9
Lane LOS			B				E	E
Approach Delay (s)	0.0		0.3				42.6	39.9
Approach LOS							E	E

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	57.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	449	0	12	381	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	488	0	13	414	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			488		928	488
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			488		928	488
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	93
cM capacity (veh/h)			1075		294	580

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	488	13	414	42
Volume Left	0	13	0	0
Volume Right	0	0	0	42
cSH	1700	1075	1700	580
Volume to Capacity	0.29	0.01	0.24	0.07
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.4	0.0	11.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.7
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	499	0	17	351	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	542	0	18	382	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			542		961	542
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			542		961	542
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	92
cM capacity (veh/h)			1026		279	540

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	542	18	382	42
Volume Left	0	18	0	0
Volume Right	0	0	0	42
cSH	1700	1026	1700	540
Volume to Capacity	0.32	0.02	0.22	0.08
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.6	0.0	12.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		12.2
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	573	0	13	478	0	44
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	591	0	13	493	0	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			591		1110	591
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			591		1110	591
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	91
cM capacity (veh/h)			985		228	507

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	591	13	493	45
Volume Left	0	13	0	0
Volume Right	0	0	0	45
cSH	1700	985	1700	507
Volume to Capacity	0.35	0.01	0.29	0.09
Queue Length 95th (ft)	0	1	0	7
Control Delay (s)	0.0	8.7	0.0	12.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		12.8
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

CUMULATIVE PLUS PROJECT CONDITIONS (ALTERNATIVE A) WITH MITIGATION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	133	586	161	262	587	204	175	1127	527	329	953	116
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	136	598	164	267	599	208	179	1150	538	336	972	118
RTOR Reduction (vph)	0	0	128	0	0	167	0	0	159	0	0	69
Lane Group Flow (vph)	136	598	36	267	599	41	179	1150	379	336	972	49
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.7	18.6	18.6	7.1	17.0	17.0	8.1	32.6	32.6	11.4	35.9	35.9
Effective Green, g (s)	8.7	18.6	18.6	7.1	17.0	17.0	8.1	32.6	32.6	11.4	35.9	35.9
Actuated g/C Ratio	0.10	0.22	0.22	0.08	0.20	0.20	0.09	0.38	0.38	0.13	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	768	344	284	702	314	167	1346	602	457	1482	663
v/s Ratio Prot	0.08	0.17		c0.08	c0.17		c0.10	c0.32		0.10	c0.27	
v/s Ratio Perm			0.02			0.03			0.24			0.03
v/c Ratio	0.76	0.78	0.10	0.94	0.85	0.13	1.07	0.85	0.63	0.74	0.66	0.07
Uniform Delay, d1	37.5	31.6	26.9	39.1	33.1	28.3	38.8	24.4	21.6	35.7	20.0	14.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.4	5.0	0.1	37.6	9.9	0.2	90.1	5.5	2.2	6.1	1.1	0.0
Delay (s)	53.9	36.6	27.0	76.7	43.0	28.5	128.9	29.9	23.8	41.8	21.0	15.0
Level of Service	D	D	C	E	D	C	F	C	C	D	C	B
Approach Delay (s)		37.5			48.6			37.6			25.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	36.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	128	594	138	196	573	168	105	1091	520	363	1059	119
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	131	606	141	200	585	171	107	1113	531	370	1081	121
RTOR Reduction (vph)	0	0	111	0	0	137	0	0	155	0	0	67
Lane Group Flow (vph)	131	606	30	200	585	34	107	1113	376	370	1081	54
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.6	18.4	18.4	7.1	16.9	16.9	6.1	33.2	33.2	11.5	38.6	38.6
Effective Green, g (s)	8.6	18.4	18.4	7.1	16.9	16.9	6.1	33.2	33.2	11.5	38.6	38.6
Actuated g/C Ratio	0.10	0.21	0.21	0.08	0.20	0.20	0.07	0.39	0.39	0.13	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	755	338	283	694	310	125	1363	610	458	1585	709
v/s Ratio Prot	c0.07	c0.17		0.06	0.17		0.06	c0.31		c0.11	0.31	
v/s Ratio Perm			0.02			0.02			0.24			0.03
v/c Ratio	0.74	0.80	0.09	0.71	0.84	0.11	0.86	0.82	0.62	0.81	0.68	0.08
Uniform Delay, d1	37.7	32.2	27.2	38.5	33.4	28.5	39.6	23.8	21.4	36.3	18.9	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.3	6.2	0.1	7.8	9.2	0.2	40.2	3.9	1.9	10.1	1.2	0.0
Delay (s)	53.0	38.3	27.3	46.3	42.5	28.6	79.8	27.7	23.2	46.3	20.1	13.7
Level of Service	D	D	C	D	D	C	E	C	C	D	C	B
Approach Delay (s)		38.8			40.8			29.5			25.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	86.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	154	608	63	714	686	199	112	892	439	473	580	144
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	661	68	776	746	216	122	970	477	514	630	157
RTOR Reduction (vph)	0	0	55	0	0	155	0	0	288	0	0	111
Lane Group Flow (vph)	167	661	13	776	746	61	122	970	189	514	630	46
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.4	17.0	17.0	20.0	25.6	25.6	10.4	24.0	24.0	13.0	26.6	26.6
Effective Green, g (s)	11.4	17.0	17.0	20.0	25.6	25.6	10.4	24.0	24.0	13.0	26.6	26.6
Actuated g/C Ratio	0.13	0.19	0.19	0.22	0.28	0.28	0.12	0.27	0.27	0.14	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	224	668	299	763	1007	450	205	944	422	496	1046	468
v/s Ratio Prot	0.09	c0.19		c0.23	0.21		0.07	c0.27		c0.15	c0.18	
v/s Ratio Perm			0.01			0.04			0.12			0.03
v/c Ratio	0.75	0.99	0.04	1.02	0.74	0.14	0.60	1.03	0.45	1.04	0.60	0.10
Uniform Delay, d1	37.9	36.4	29.8	35.0	29.2	24.0	37.8	33.0	27.5	38.5	27.2	23.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.6	31.8	0.1	36.9	3.0	0.1	4.6	36.5	0.8	50.1	1.0	0.1
Delay (s)	50.5	68.2	29.9	71.9	32.2	24.1	42.4	69.5	28.2	88.6	28.2	23.1
Level of Service	D	E	C	E	C	C	D	E	C	F	C	C
Approach Delay (s)		62.0			48.9			54.9			51.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	53.3	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.99	
Satd. Flow (prot)	1770	3532		1770	3539	1583		1734			1849	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.97	
Satd. Flow (perm)	1770	3532		1770	3539	1583		1656			1810	
Volume (vph)	449	817	12	90	1613	19	8	21	26	2	10	0
Peak-hour factor, PHF	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Adj. Flow (vph)	488	842	12	93	1663	21	8	23	27	2	11	0
RTOR Reduction (vph)	0	1	0	0	0	10	0	26	0	0	0	0
Lane Group Flow (vph)	488	853	0	93	1663	11	0	32	0	0	13	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	25.0	61.1		7.0	43.1	43.1		3.6			3.6	
Effective Green, g (s)	25.0	61.1		7.0	43.1	43.1		3.6			3.6	
Actuated g/C Ratio	0.30	0.73		0.08	0.51	0.51		0.04			0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	529	2578		148	1822	815		71			78	
v/s Ratio Prot	c0.28	0.24		0.05	c0.47							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.92	0.33		0.63	0.91	0.01		0.45			0.17	
Uniform Delay, d1	28.4	4.0		37.1	18.6	9.9		39.1			38.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	21.8	0.1		8.1	7.4	0.0		4.5			1.0	
Delay (s)	50.2	4.1		45.2	26.0	9.9		43.6			39.6	
Level of Service	D	A		D	C	A		D			D	
Approach Delay (s)		20.8			26.8			43.6			39.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85		0.92			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			0.99	
Satd. Flow (prot)	1770	3511		1770	3539	1583		1713			1852	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.96	
Satd. Flow (perm)	1770	3511		1770	3539	1583		1681			1788	
Volume (vph)	490	897	49	71	1315	25	4	25	41	2	15	0
Peak-hour factor, PHF	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Adj. Flow (vph)	533	925	51	73	1356	27	4	27	42	2	16	0
RTOR Reduction (vph)	0	4	0	0	0	15	0	40	0	0	0	0
Lane Group Flow (vph)	533	972	0	73	1356	12	0	33	0	0	18	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	26.6	56.3		6.0	35.7	35.7		4.2			4.2	
Effective Green, g (s)	26.6	56.3		6.0	35.7	35.7		4.2			4.2	
Actuated g/C Ratio	0.34	0.72		0.08	0.45	0.45		0.05			0.05	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	600	2518		135	1609	720		90			96	
v/s Ratio Prot	c0.30	0.28		0.04	c0.38							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.89	0.39		0.54	0.84	0.02		0.37			0.19	
Uniform Delay, d1	24.5	4.3		34.9	18.9	11.8		35.9			35.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.9	0.1		4.4	4.2	0.0		2.6			0.9	
Delay (s)	39.4	4.4		39.3	23.1	11.8		38.4			36.5	
Level of Service	D	A		D	C	B		D			D	
Approach Delay (s)		16.8			23.7			38.4			36.5	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.99	
Satd. Flow (prot)	1770	3533		1770	3539	1583		1715			1849	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.90			0.97	
Satd. Flow (perm)	1770	3533		1770	3539	1583		1565			1805	
Volume (vph)	573	1565	18	26	1076	27	19	16	34	2	11	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	591	1613	19	27	1109	28	20	16	35	2	11	0
RTOR Reduction (vph)	0	1	0	0	0	16	0	34	0	0	0	0
Lane Group Flow (vph)	591	1631	0	27	1109	12	0	37	0	0	13	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	28.3	58.1		1.6	31.4	31.4		2.9			2.9	
Effective Green, g (s)	28.3	58.1		1.6	31.4	31.4		2.9			2.9	
Actuated g/C Ratio	0.38	0.78		0.02	0.42	0.42		0.04			0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	671	2752		38	1490	666		61			70	
v/s Ratio Prot	c0.33	0.46		0.02	c0.31							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.88	0.59		0.71	0.74	0.02		0.61			0.19	
Uniform Delay, d1	21.6	3.4		36.3	18.2	12.6		35.3			34.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	12.9	0.3		47.3	2.1	0.0		16.8			1.3	
Delay (s)	34.5	3.7		83.5	20.3	12.6		52.1			36.0	
Level of Service	C	A		F	C	B		D			D	
Approach Delay (s)		11.9			21.6			52.1			36.0	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	74.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX D

ALTERNATIVE B LEVEL OF SERVICE WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1818	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1731	1583	1770	1818	
Volume (vph)	62	851	227	37	1349	57	391	155	69	58	131	25
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	64	877	234	38	1391	59	403	160	71	60	135	26
RTOR Reduction (vph)	0	0	123	0	0	31	0	0	57	0	8	0
Lane Group Flow (vph)	64	877	111	38	1391	28	274	289	14	60	153	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.6	38.8	38.8	3.2	38.4	38.4	16.6	16.6	16.6	7.1	7.1	
Effective Green, g (s)	3.6	38.8	38.8	3.2	38.4	38.4	16.6	16.6	16.6	7.1	7.1	
Actuated g/C Ratio	0.04	0.47	0.47	0.04	0.47	0.47	0.20	0.20	0.20	0.09	0.09	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	78	1681	752	69	1663	744	342	352	322	154	158	
v/s Ratio Prot	c0.04	0.25		0.02	c0.39		0.16	c0.17		0.03	c0.08	
v/s Ratio Perm			0.07			0.02			0.01			
v/c Ratio	0.82	0.52	0.15	0.55	0.84	0.04	0.80	0.82	0.04	0.39	0.97	
Uniform Delay, d1	38.7	15.0	12.1	38.5	18.9	11.7	31.0	31.1	26.2	35.3	37.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	47.4	0.3	0.1	9.2	3.8	0.0	12.6	14.2	0.1	1.6	61.1	
Delay (s)	86.1	15.3	12.2	47.7	22.7	11.7	43.6	45.3	26.2	36.9	98.3	
Level of Service	F	B	B	D	C	B	D	D	C	D	F	
Approach Delay (s)		18.5			22.9			42.4			81.6	
Approach LOS		B			C			D			F	

Intersection Summary			
HCM Average Control Delay	28.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1727	1583	1770	1783	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1727	1583	1770	1783	
Volume (vph)	61	992	190	40	1079	48	240	83	72	51	95	38
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	63	1023	196	41	1112	49	247	86	74	53	98	39
RTOR Reduction (vph)	0	0	104	0	0	26	0	0	62	0	16	0
Lane Group Flow (vph)	63	1023	92	41	1112	23	162	171	12	53	121	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.1	34.6	34.6	3.1	34.6	34.6	12.0	12.0	12.0	8.0	8.0	
Effective Green, g (s)	3.1	34.6	34.6	3.1	34.6	34.6	12.0	12.0	12.0	8.0	8.0	
Actuated g/C Ratio	0.04	0.47	0.47	0.04	0.47	0.47	0.16	0.16	0.16	0.11	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	74	1661	743	74	1661	743	274	281	258	192	194	
v/s Ratio Prot	c0.04	0.29		0.02	c0.31		0.10	c0.10		0.03	c0.07	
v/s Ratio Perm			0.06			0.01			0.01			
v/c Ratio	0.85	0.62	0.12	0.55	0.67	0.03	0.59	0.61	0.05	0.28	0.62	
Uniform Delay, d1	35.1	14.6	11.0	34.6	15.1	10.5	28.6	28.7	26.0	30.2	31.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	57.1	0.7	0.1	8.7	1.0	0.0	3.4	3.7	0.1	0.8	6.1	
Delay (s)	92.2	15.3	11.1	43.3	16.2	10.5	32.0	32.4	26.1	31.0	37.5	
Level of Service	F	B	B	D	B	B	C	C	C	C	D	
Approach Delay (s)		18.4			16.9			31.1			35.7	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	73.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.95	0.95	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.88	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1640	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1681	1770	1583	1770	1640	
Volume (vph)	65	1323	502	47	1035	55	51	142	262	93	51	203
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	1364	518	48	1067	57	53	146	270	96	53	209
RTOR Reduction (vph)	0	0	272	0	0	32	0	0	165	0	159	0
Lane Group Flow (vph)	67	1364	246	48	1067	25	53	146	105	96	103	0
Turn Type	Prot		Perm	Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.0	34.8	34.8	2.0	32.8	32.8	11.3	11.3	11.3	9.3	9.3	
Effective Green, g (s)	4.0	34.8	34.8	2.0	32.8	32.8	11.3	11.3	11.3	9.3	9.3	
Actuated g/C Ratio	0.05	0.47	0.47	0.03	0.45	0.45	0.15	0.15	0.15	0.13	0.13	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	96	1678	751	48	1581	707	259	272	244	224	208	
v/s Ratio Prot	c0.04	c0.39		0.03	0.30		0.03	c0.08		0.05	c0.06	
v/s Ratio Perm			0.16			0.02			0.07			
v/c Ratio	0.70	0.81	0.33	1.00	0.67	0.04	0.20	0.54	0.43	0.43	0.50	
Uniform Delay, d1	34.1	16.5	12.0	35.7	16.1	11.4	27.1	28.6	28.1	29.6	29.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.8	3.1	0.3	129.9	1.2	0.0	0.4	2.0	1.2	1.3	1.9	
Delay (s)	53.9	19.6	12.3	165.6	17.2	11.4	27.5	30.7	29.4	30.9	31.7	
Level of Service	D	B	B	F	B	B	C	C	C	C	C	
Approach Delay (s)		18.9			23.0			29.6			31.5	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	200	21	143	981	1151	228
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	208	22	149	1022	1199	238
RTOR Reduction (vph)	0	18	0	0	0	118
Lane Group Flow (vph)	208	4	149	1022	1199	120
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	12.9	12.9	9.4	48.2	34.8	34.8
Effective Green, g (s)	12.9	12.9	9.4	48.2	34.8	34.8
Actuated g/C Ratio	0.19	0.19	0.14	0.70	0.50	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	330	296	241	2469	1782	797
v/s Ratio Prot	c0.12		c0.08	0.29	c0.34	
v/s Ratio Perm		0.00				0.08
v/c Ratio	0.63	0.01	0.62	0.41	0.67	0.15
Uniform Delay, d1	25.9	22.9	28.2	4.4	12.9	9.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.0	4.7	0.1	1.0	0.1
Delay (s)	29.8	22.9	32.8	4.6	13.9	9.3
Level of Service	C	C	C	A	B	A
Approach Delay (s)	29.1			8.2	13.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	69.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	133	48	96	869	1012	132
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	148	53	107	966	1124	147
RTOR Reduction (vph)	0	45	0	0	0	63
Lane Group Flow (vph)	148	8	107	966	1124	84
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	9.6	9.6	6.2	47.7	37.5	37.5
Effective Green, g (s)	9.6	9.6	6.2	47.7	37.5	37.5
Actuated g/C Ratio	0.15	0.15	0.09	0.73	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	260	233	168	2585	2032	909
v/s Ratio Prot	c0.08		c0.06	0.27	c0.32	
v/s Ratio Perm		0.00				0.05
v/c Ratio	0.57	0.03	0.64	0.37	0.55	0.09
Uniform Delay, d1	25.9	23.9	28.5	3.3	8.7	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1	7.7	0.1	0.3	0.0
Delay (s)	28.8	23.9	36.1	3.4	9.0	6.3
Level of Service	C	C	D	A	A	A
Approach Delay (s)	27.5			6.6	8.7	
Approach LOS	C			A	A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3539	3539	1583
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	1770	3539	3539	1583
Volume (vph)	240	91	62	1447	1321	269
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	250	95	65	1507	1376	280
RTOR Reduction (vph)	0	75	0	0	0	125
Lane Group Flow (vph)	250	20	65	1507	1376	155
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	14.7	14.7	4.6	47.2	38.6	38.6
Effective Green, g (s)	14.7	14.7	4.6	47.2	38.6	38.6
Actuated g/C Ratio	0.21	0.21	0.07	0.68	0.55	0.55
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	372	333	116	2390	1954	874
v/s Ratio Prot	c0.14		0.04	c0.43	c0.39	
v/s Ratio Perm		0.01				0.10
v/c Ratio	0.67	0.06	0.56	0.63	0.70	0.18
Uniform Delay, d1	25.4	22.1	31.7	6.4	11.5	7.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.1	6.1	0.5	1.2	0.1
Delay (s)	30.1	22.2	37.7	7.0	12.6	7.9
Level of Service	C	C	D	A	B	A
Approach Delay (s)	27.9			8.2	11.8	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Volume (vph)	61	876	99	45	945	1155	36	116	8	1073	140	104
Peak-hour factor, PHF	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. Flow (vph)	61	876	99	45	945	1155	36	116	8	1073	140	104
RTOR Reduction (vph)	0	0	68	0	0	0	0	0	8	0	0	62
Lane Group Flow (vph)	61	876	31	45	945	1155	36	116	0	591	622	42
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	2.8	25.6	25.6	2.1	24.9	81.7	5.0	5.0	5.0	33.0	33.0	33.0
Effective Green, g (s)	2.8	25.6	25.6	2.1	24.9	81.7	5.0	5.0	5.0	33.0	33.0	33.0
Actuated g/C Ratio	0.03	0.31	0.31	0.03	0.30	1.00	0.06	0.06	0.06	0.40	0.40	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	61	1109	496	45	1079	1583	108	114	97	679	688	639
v/s Ratio Prot	0.03	0.25		0.03	c0.27		0.02	0.06		0.35	c0.37	
v/s Ratio Perm			0.02			c0.73			0.00			0.03
v/c Ratio	1.00	0.79	0.06	1.00	0.88	0.73	0.33	1.02	0.01	0.87	0.90	0.07
Uniform Delay, d1	39.5	25.6	19.6	39.8	26.9	0.0	36.8	38.4	36.0	22.4	22.9	14.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	115.2	3.8	0.1	134.2	8.1	3.0	1.8	89.1	0.0	11.7	15.3	0.0
Delay (s)	154.7	29.4	19.7	174.0	35.1	3.0	38.6	127.4	36.0	34.1	38.2	15.0
Level of Service	F	C	B	F	D	A	D	F	D	C	D	B
Approach Delay (s)		35.9			20.7			102.9			34.5	
Approach LOS		D			C			F			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1704	1583
Volume (vph)	55	808	47	80	884	884	47	66	14	1049	142	85
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	56	824	48	82	902	902	48	67	14	1070	145	87
RTOR Reduction (vph)	0	0	34	0	0	0	0	0	13	0	0	51
Lane Group Flow (vph)	56	824	14	82	902	902	48	67	1	592	623	36
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	3.5	23.1	23.1	4.2	23.8	79.4	3.5	3.5	3.5	32.6	32.6	32.6
Effective Green, g (s)	3.5	23.1	23.1	4.2	23.8	79.4	3.5	3.5	3.5	32.6	32.6	32.6
Actuated g/C Ratio	0.04	0.29	0.29	0.05	0.30	1.00	0.04	0.04	0.04	0.41	0.41	0.41
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	78	1030	461	94	1061	1583	78	82	70	690	700	650
v/s Ratio Prot	0.03	0.23		0.05	c0.25		0.03	0.04		0.35	c0.37	
v/s Ratio Perm			0.01			c0.57			0.00			0.02
v/c Ratio	0.72	0.80	0.03	0.87	0.85	0.57	0.62	0.82	0.01	0.86	0.89	0.05
Uniform Delay, d1	37.5	26.0	20.1	37.3	26.1	0.0	37.3	37.6	36.3	21.3	21.7	14.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.9	4.5	0.0	53.6	6.7	1.5	13.6	44.3	0.1	10.3	13.5	0.0
Delay (s)	64.3	30.5	20.2	90.9	32.8	1.5	50.8	82.0	36.3	31.6	35.2	14.1
Level of Service	E	C	C	F	C	A	D	F	D	C	D	B
Approach Delay (s)		32.0			20.3			65.4			32.2	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.4	Sum of lost time (s)	4.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.97	1.00
Satd. Flow (perm)	1770	3539	1583	1770	3539	1583	1770	1863	1583	1681	1708	1583
Volume (vph)	71	1144	135	80	711	1301	68	161	39	1074	177	162
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	72	1156	136	81	718	1314	69	163	39	1085	179	164
RTOR Reduction (vph)	0	0	91	0	0	0	0	0	36	0	0	104
Lane Group Flow (vph)	72	1156	45	81	718	1314	69	163	3	616	648	60
Turn Type	Prot		Perm	Prot		Free	Split		Perm	Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases			4			Free			6			2
Actuated Green, G (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Effective Green, g (s)	4.8	29.8	29.8	4.0	29.0	90.8	8.0	8.0	8.0	33.0	33.0	33.0
Actuated g/C Ratio	0.05	0.33	0.33	0.04	0.32	1.00	0.09	0.09	0.09	0.36	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	1161	520	78	1130	1583	156	164	139	611	621	575
v/s Ratio Prot	0.04	c0.33		0.05	0.20		0.04	0.09		0.37	c0.38	
v/s Ratio Perm			0.03			c0.83			0.00			0.04
v/c Ratio	0.77	1.00	0.09	1.04	0.64	0.83	0.44	0.99	0.02	1.01	1.04	0.10
Uniform Delay, d1	42.4	30.4	21.1	43.4	26.4	0.0	39.3	41.4	37.8	28.9	28.9	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.4	25.2	0.1	112.9	1.2	5.2	2.0	68.1	0.1	38.4	48.0	0.1
Delay (s)	72.8	55.6	21.2	156.3	27.6	5.2	41.3	109.5	37.9	67.3	76.9	19.2
Level of Service	E	E	C	F	C	A	D	F	D	E	E	B
Approach Delay (s)		53.1			18.6			81.8			66.1	
Approach LOS		D			B			F			E	

Intersection Summary			
HCM Average Control Delay	44.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	92.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.99		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4814		1770	5076		1681	1675		1770	1710	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4814		1770	5076		1681	1675		1770	1710	
Volume (vph)	39	1276	705	59	1533	19	589	22	28	24	19	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	40	1302	719	60	1564	19	601	22	29	24	19	23
RTOR Reduction (vph)	0	106	0	0	2	0	0	4	0	0	22	0
Lane Group Flow (vph)	40	1915	0	60	1581	0	323	325	0	24	20	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	2.9	36.2		3.4	36.7		17.4	17.4		2.4	2.4	
Effective Green, g (s)	2.9	36.2		3.4	36.7		17.4	17.4		2.4	2.4	
Actuated g/C Ratio	0.04	0.48		0.05	0.49		0.23	0.23		0.03	0.03	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	2311		80	2471		388	387		56	54	
v/s Ratio Prot	0.02	c0.40		c0.03	0.31		0.19	c0.19		c0.01	0.01	
v/s Ratio Perm												
v/c Ratio	0.59	0.83		0.75	0.64		0.83	0.84		0.43	0.37	
Uniform Delay, d1	35.7	16.9		35.6	14.4		27.6	27.7		35.8	35.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.3	2.6		32.0	0.6		14.1	15.0		5.2	4.2	
Delay (s)	48.0	19.5		67.6	15.0		41.7	42.7		41.0	39.9	
Level of Service	D	B		E	B		D	D		D	D	
Approach Delay (s)		20.1			16.9			42.2			40.3	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.97		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.98		0.95	1.00	
Satd. Flow (prot)	1770	4774		1770	5019		1681	1680		1770	1678	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.98		0.95	1.00	
Satd. Flow (perm)	1770	4774		1770	5019		1681	1680		1770	1678	
Volume (vph)	224	928	638	70	1447	137	548	120	68	142	91	179
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	238	987	679	74	1539	146	583	128	72	151	97	190
RTOR Reduction (vph)	0	133	0	0	12	0	0	9	0	0	79	0
Lane Group Flow (vph)	238	1533	0	74	1673	0	387	387	0	151	208	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	13.0	40.0		4.8	31.8		17.0	17.0		12.6	12.6	
Effective Green, g (s)	13.0	40.0		4.8	31.8		17.0	17.0		12.6	12.6	
Actuated g/C Ratio	0.14	0.44		0.05	0.35		0.19	0.19		0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	2112		94	1766		316	316		247	234	
v/s Ratio Prot	c0.13	0.32		0.04	c0.33		0.23	c0.23		0.09	c0.12	
v/s Ratio Perm												
v/c Ratio	0.93	0.73		0.79	0.95		1.22	1.22		0.61	0.89	
Uniform Delay, d1	38.3	20.7		42.3	28.5		36.7	36.7		36.6	38.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.5	1.3		34.1	11.2		126.0	126.1		4.4	30.7	
Delay (s)	76.7	22.0		76.4	39.7		162.7	162.8		41.0	68.9	
Level of Service	E	C		E	D		F	F		D	E	
Approach Delay (s)		28.8			41.2			162.8			59.3	
Approach LOS		C			D			F			E	

Intersection Summary			
HCM Average Control Delay	57.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	90.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.95	0.95		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.98		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (prot)	1770	4838		1770	5080		1681	1669		1770	1745	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	0.96		0.95	1.00	
Satd. Flow (perm)	1770	4838		1770	5080		1681	1669		1770	1745	
Volume (vph)	24	1498	718	34	1228	8	883	10	46	28	28	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	24	1529	733	35	1253	8	901	10	47	29	29	21
RTOR Reduction (vph)	0	92	0	0	1	0	0	4	0	0	20	0
Lane Group Flow (vph)	24	2170	0	35	1260	0	496	458	0	29	30	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Effective Green, g (s)	1.9	41.1		2.8	42.0		24.2	24.2		3.9	3.9	
Actuated g/C Ratio	0.02	0.47		0.03	0.48		0.27	0.27		0.04	0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	38	2260		56	2425		462	459		78	77	
v/s Ratio Prot	0.01	c0.45		c0.02	0.25		c0.30	0.27		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.63	0.96		0.62	0.52		1.07	1.00		0.37	0.39	
Uniform Delay, d1	42.7	22.7		42.1	16.0		31.9	31.9		40.9	40.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.5	11.1		19.8	0.2		63.0	41.0		3.0	3.2	
Delay (s)	72.2	33.7		61.8	16.2		94.9	72.8		43.8	44.1	
Level of Service	E	C		E	B		F	E		D	D	
Approach Delay (s)		34.1			17.4			84.2			44.0	
Approach LOS		C			B			F			D	

Intersection Summary			
HCM Average Control Delay	40.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	88.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3481	
Volume (vph)	59	368	195	104	302	105	182	761	126	111	718	88
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	62	387	205	109	318	111	192	801	133	117	756	93
RTOR Reduction (vph)	0	0	148	0	0	77	0	0	90	0	10	0
Lane Group Flow (vph)	62	387	57	109	318	34	192	801	43	117	839	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.6	24.6	7.5	22.9	
Effective Green, g (s)	4.0	21.1	21.1	6.1	23.2	23.2	9.2	24.6	24.6	7.5	22.9	
Actuated g/C Ratio	0.05	0.28	0.28	0.08	0.31	0.31	0.12	0.33	0.33	0.10	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	94	522	444	143	574	488	216	1156	517	176	1059	
v/s Ratio Prot	0.04	c0.21		c0.06	0.17		c0.11	0.23		0.07	c0.24	
v/s Ratio Perm			0.04			0.02			0.03			
v/c Ratio	0.66	0.74	0.13	0.76	0.55	0.07	0.89	0.69	0.08	0.66	0.79	
Uniform Delay, d1	35.0	24.6	20.2	33.9	21.7	18.4	32.5	22.1	17.6	32.7	24.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	5.6	0.1	21.0	1.2	0.1	32.6	1.8	0.1	9.1	4.1	
Delay (s)	50.5	30.2	20.4	54.9	22.9	18.5	65.2	23.9	17.6	41.8	28.1	
Level of Service	D	C	C	D	C	B	E	C	B	D	C	
Approach Delay (s)		29.1			28.5			30.2			29.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3498	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3498	
Volume (vph)	81	271	174	91	277	155	147	819	92	117	878	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	82	274	176	92	280	157	148	827	93	118	887	75
RTOR Reduction (vph)	0	0	142	0	0	125	0	0	52	0	6	0
Lane Group Flow (vph)	82	274	34	92	280	32	148	827	41	118	956	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Effective Green, g (s)	5.1	15.8	15.8	5.9	16.6	16.6	8.9	36.0	36.0	8.0	35.1	
Actuated g/C Ratio	0.06	0.19	0.19	0.07	0.20	0.20	0.11	0.44	0.44	0.10	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	110	360	306	128	379	322	193	1559	698	173	1503	
v/s Ratio Prot	0.05	0.15		c0.05	c0.15		c0.08	0.23		0.07	c0.27	
v/s Ratio Perm			0.02			0.02			0.03			
v/c Ratio	0.75	0.76	0.11	0.72	0.74	0.10	0.77	0.53	0.06	0.68	0.64	
Uniform Delay, d1	37.7	31.2	27.2	37.1	30.5	26.5	35.4	16.7	13.1	35.6	18.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	23.7	9.2	0.2	17.5	7.4	0.1	16.5	1.3	0.2	10.6	2.1	
Delay (s)	61.3	40.3	27.3	54.6	37.9	26.6	51.9	18.0	13.3	46.2	20.4	
Level of Service	E	D	C	D	D	C	D	B	B	D	C	
Approach Delay (s)		39.3			37.4			22.3			23.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3439	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	1770	1863	1583	1770	3539	1583	1770	3439	
Volume (vph)	141	496	159	40	364	236	135	592	111	199	692	161
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	142	501	161	40	368	238	136	598	112	201	699	163
RTOR Reduction (vph)	0	0	104	0	0	171	0	0	80	0	23	0
Lane Group Flow (vph)	142	501	57	40	368	67	136	598	32	201	839	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.1	21.1	9.3	23.1	
Effective Green, g (s)	7.4	26.5	26.5	2.0	21.1	21.1	7.3	21.1	21.1	9.3	23.1	
Actuated g/C Ratio	0.10	0.35	0.35	0.03	0.28	0.28	0.10	0.28	0.28	0.12	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	659	560	47	525	446	173	997	446	220	1061	
v/s Ratio Prot	c0.08	c0.27		0.02	0.20		0.08	0.17		c0.11	c0.24	
v/s Ratio Perm			0.04			0.04			0.02			
v/c Ratio	0.81	0.76	0.10	0.85	0.70	0.15	0.79	0.60	0.07	0.91	0.79	
Uniform Delay, d1	33.1	21.4	16.2	36.3	24.1	20.2	33.0	23.3	19.7	32.4	23.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.0	5.2	0.1	77.3	4.2	0.2	20.5	1.0	0.1	37.6	4.1	
Delay (s)	57.1	26.5	16.3	113.6	28.3	20.3	53.6	24.2	19.8	70.0	27.8	
Level of Service	E	C	B	F	C	C	D	C	B	E	C	
Approach Delay (s)		29.9			30.6			28.4			35.8	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	132	584	161	262	585	204	175	1125	527	329	951	115
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	615	169	276	616	215	184	1184	555	346	1001	121
RTOR Reduction (vph)	0	0	139	0	0	174	0	0	162	0	0	70
Lane Group Flow (vph)	139	615	30	276	616	41	184	1184	393	346	1001	51
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Effective Green, g (s)	7.0	16.0	16.0	8.0	17.0	17.0	12.2	32.0	32.0	18.0	37.8	37.8
Actuated g/C Ratio	0.08	0.18	0.18	0.09	0.19	0.19	0.14	0.36	0.36	0.20	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	138	629	281	305	668	299	240	1258	563	354	1486	665
v/s Ratio Prot	0.08	0.17		c0.08	c0.17		0.10	c0.33		c0.20	0.28	
v/s Ratio Perm			0.02			0.03			0.25			0.03
v/c Ratio	1.01	0.98	0.11	0.90	0.92	0.14	0.77	0.94	0.70	0.98	0.67	0.08
Uniform Delay, d1	41.5	36.8	31.0	40.6	35.9	30.4	37.5	28.1	24.9	35.8	21.1	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	78.5	30.0	0.2	28.4	18.3	0.2	13.6	13.7	3.8	41.3	1.2	0.0
Delay (s)	120.0	66.8	31.2	69.0	54.1	30.6	51.1	41.7	28.6	77.1	22.3	15.7
Level of Service	F	E	C	E	D	C	D	D	C	E	C	B
Approach Delay (s)		68.3			53.3			38.9			34.7	
Approach LOS		E			D			D			C	

Intersection Summary			
HCM Average Control Delay	45.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	153	606	63	713	683	199	112	889	439	473	577	141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	659	68	775	742	216	122	966	477	514	627	153
RTOR Reduction (vph)	0	0	57	0	0	163	0	0	261	0	0	98
Lane Group Flow (vph)	166	659	11	775	742	53	122	966	216	514	627	55
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Effective Green, g (s)	9.0	14.0	14.0	17.0	22.0	22.0	10.4	22.0	22.0	21.0	32.6	32.6
Actuated g/C Ratio	0.10	0.16	0.16	0.19	0.24	0.24	0.12	0.24	0.24	0.23	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	551	246	648	865	387	205	865	387	413	1282	573
v/s Ratio Prot	0.09	c0.19		c0.23	0.21		0.07	c0.27		c0.29	0.18	
v/s Ratio Perm			0.01			0.03			0.14			0.04
v/c Ratio	0.94	1.20	0.04	1.20	0.86	0.14	0.60	1.12	0.56	1.24	0.49	0.10
Uniform Delay, d1	40.2	38.0	32.3	36.5	32.5	26.6	37.8	34.0	29.8	34.5	22.2	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.3	105.0	0.1	102.7	8.4	0.2	4.6	67.9	1.8	129.0	0.3	0.1
Delay (s)	89.5	143.0	32.4	139.2	40.9	26.7	42.4	101.9	31.5	163.5	22.5	19.0
Level of Service	F	F	C	F	D	C	D	F	C	F	C	B
Approach Delay (s)		124.6			83.1			75.8			78.1	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	86.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	127	592	138	196	571	168	105	1088	520	363	1055	117
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	604	141	200	583	171	107	1110	531	370	1077	119
RTOR Reduction (vph)	0	0	115	0	0	141	0	0	149	0	0	63
Lane Group Flow (vph)	130	604	26	200	583	30	107	1110	382	370	1077	56
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.7	31.7	31.7	20.0	43.0	43.0
Effective Green, g (s)	7.0	17.0	17.0	6.0	16.0	16.0	8.7	31.7	31.7	20.0	43.0	43.0
Actuated g/C Ratio	0.08	0.19	0.19	0.07	0.18	0.18	0.10	0.35	0.35	0.22	0.47	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	137	663	297	227	624	279	170	1237	553	390	1678	750
v/s Ratio Prot	c0.07	c0.17		0.06	0.16		0.06	c0.31		c0.21	0.30	
v/s Ratio Perm			0.02			0.02			0.24			0.04
v/c Ratio	0.95	0.91	0.09	0.88	0.93	0.11	0.63	0.90	0.69	0.95	0.64	0.08
Uniform Delay, d1	41.7	36.1	30.5	42.0	36.8	31.4	39.4	28.0	25.3	34.8	18.0	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.6	16.8	0.1	30.3	21.2	0.2	7.1	8.8	3.7	32.2	0.8	0.0
Delay (s)	102.3	52.9	30.6	72.3	58.0	31.5	46.6	36.8	29.0	67.1	18.9	13.0
Level of Service	F	D	C	E	E	C	D	D	C	E	B	B
Approach Delay (s)		56.6			56.3			35.0			29.8	
Approach LOS		E			E			D			C	

Intersection Summary			
HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4970		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4970		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	84	620	111	604	1343	200	164	527	536	191	587	104
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	86	633	113	616	1370	204	167	538	547	195	599	106
RTOR Reduction (vph)	0	28	0	0	0	117	0	0	36	0	0	83
Lane Group Flow (vph)	86	718	0	616	1370	87	167	538	511	195	599	23
Turn Type	Prot			Prot		Perm	Prot		pt+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	2 3	1	6	
Permitted Phases						8						6
Actuated Green, G (s)	4.5	20.2		20.3	36.0	36.0	9.8	17.0	41.3	11.4	18.6	18.6
Effective Green, g (s)	4.5	20.2		20.3	36.0	36.0	9.8	17.0	41.3	11.4	18.6	18.6
Actuated g/C Ratio	0.05	0.24		0.24	0.42	0.42	0.12	0.20	0.49	0.13	0.22	0.22
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	94	1182		821	1501	671	204	709	770	238	775	347
v/s Ratio Prot	0.05	0.14		0.18	c0.39		0.09	0.15	c0.32	c0.11	c0.17	
v/s Ratio Perm						0.05						0.01
v/c Ratio	0.91	0.61		0.75	0.91	0.13	0.82	0.76	0.66	0.82	0.77	0.07
Uniform Delay, d1	40.0	28.8		29.9	23.0	14.9	36.7	32.0	16.5	35.7	31.2	26.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	65.2	0.9		3.9	8.8	0.1	21.9	4.7	2.2	19.3	4.8	0.1
Delay (s)	105.2	29.7		33.8	31.7	15.0	58.5	36.7	18.7	55.0	36.0	26.4
Level of Service	F	C		C	C	B	E	D	B	E	D	C
Approach Delay (s)		37.5			30.8			31.7			39.0	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4991		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4991		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	50	650	92	497	1066	126	100	551	453	108	487	62
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	684	97	523	1122	133	105	580	477	114	513	65
RTOR Reduction (vph)	0	20	0	0	0	75	0	0	70	0	0	50
Lane Group Flow (vph)	53	761	0	523	1122	58	105	580	407	114	513	15
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	2.5	19.5		16.6	33.6	33.6	7.1	17.1	33.7	7.3	17.3	17.3
Effective Green, g (s)	2.5	19.5		16.6	33.6	33.6	7.1	17.1	33.7	7.3	17.3	17.3
Actuated g/C Ratio	0.03	0.25		0.22	0.44	0.44	0.09	0.22	0.44	0.10	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	58	1272		745	1554	695	164	791	780	169	800	358
v/s Ratio Prot	0.03	0.15		c0.15	c0.32		0.06	c0.16	c0.11	c0.06	0.14	
v/s Ratio Perm						0.04			0.14			0.01
v/c Ratio	0.91	0.60		0.70	0.72	0.08	0.64	0.73	0.52	0.67	0.64	0.04
Uniform Delay, d1	36.9	25.1		27.7	17.6	12.5	33.5	27.6	15.5	33.5	26.8	23.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	86.9	0.8		3.0	1.7	0.1	8.3	3.5	0.6	10.2	1.8	0.0
Delay (s)	123.8	25.8		30.7	19.3	12.5	41.7	31.1	16.2	43.6	28.6	23.2
Level of Service	F	C		C	B	B	D	C	B	D	C	C
Approach Delay (s)		32.0			22.1			25.9			30.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	76.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91		0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4980		3433	3539	1583	1770	3539	1583	1770	3539	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4980		3433	3539	1583	1770	3539	1583	1770	3539	1583
Volume (vph)	121	1306	209	480	871	151	126	604	729	115	636	74
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	122	1319	211	485	880	153	127	610	736	116	642	75
RTOR Reduction (vph)	0	24	0	0	0	89	0	0	12	0	0	59
Lane Group Flow (vph)	122	1506	0	485	880	64	127	610	724	116	642	16
Turn Type	Prot			Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Effective Green, g (s)	10.3	28.0		20.0	37.7	37.7	7.0	19.5	39.5	6.0	18.5	18.5
Actuated g/C Ratio	0.12	0.31		0.22	0.42	0.42	0.08	0.22	0.44	0.07	0.21	0.21
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	204	1558		767	1491	667	138	771	769	119	732	327
v/s Ratio Prot	0.07	c0.30		0.14	0.25		c0.07	0.17	c0.21	0.07	0.18	
v/s Ratio Perm						0.04			0.25			0.01
v/c Ratio	0.60	0.97		0.63	0.59	0.10	0.92	0.79	0.94	0.97	0.88	0.05
Uniform Delay, d1	37.6	30.3		31.4	19.9	15.6	41.0	33.1	23.9	41.7	34.4	28.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	15.4		1.7	0.6	0.1	53.0	5.6	19.5	74.0	11.5	0.1
Delay (s)	42.3	45.7		33.1	20.6	15.7	94.0	38.6	43.4	115.7	45.9	28.5
Level of Service	D	D		C	C	B	F	D	D	F	D	C
Approach Delay (s)		45.5			24.1			45.8			54.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	40.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	448	825	1616	0	0	380
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	453	833	1632	0	0	384
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1632				2954	816
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1632				2954	816
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	0				0	0
cM capacity (veh/h)	394				0	320

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	453	417	417	816	816	384
Volume Left	453	0	0	0	0	0
Volume Right	0	0	0	0	0	384
cSH	394	1700	1700	1700	1700	320
Volume to Capacity	1.15	0.25	0.25	0.48	0.48	1.20
Queue Length 95th (ft)	430	0	0	0	0	416
Control Delay (s)	124.4	0.0	0.0	0.0	0.0	151.1
Lane LOS	F					F
Approach Delay (s)	43.8			0.0		151.1
Approach LOS						F

Intersection Summary			
Average Delay	34.6		
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	489	939	1314	0	0	351
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	494	948	1327	0	0	355
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1327				2789	664
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1327				2789	664
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	4				100	12
cM capacity (veh/h)	516				1	403

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	494	474	474	664	664	355
Volume Left	494	0	0	0	0	0
Volume Right	0	0	0	0	0	355
cSH	516	1700	1700	1700	1700	403
Volume to Capacity	0.96	0.28	0.28	0.39	0.39	0.88
Queue Length 95th (ft)	307	0	0	0	0	222
Control Delay (s)	58.0	0.0	0.0	0.0	0.0	52.1
Lane LOS	F					F
Approach Delay (s)	19.9			0.0		52.1
Approach LOS						F

Intersection Summary			
Average Delay	15.1		
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	573	1575	1088	0	0	477
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	591	1624	1122	0	0	492
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1122				3115	561
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1122				3115	561
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	4				100	0
cM capacity (veh/h)	618				0	471

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	591	812	812	561	561	492
Volume Left	591	0	0	0	0	0
Volume Right	0	0	0	0	0	492
cSH	618	1700	1700	1700	1700	471
Volume to Capacity	0.96	0.48	0.48	0.33	0.33	1.04
Queue Length 95th (ft)	331	0	0	0	0	373
Control Delay (s)	51.7	0.0	0.0	0.0	0.0	83.2
Lane LOS	F					F
Approach Delay (s)	13.8			0.0		83.2
Approach LOS						F

Intersection Summary			
Average Delay	18.7		
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3513		3433	3539	1583		1828	1583		2916	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3513		3433	3539	1583		1828	1583		2916	1346
Volume (vph)	0	921	48	296	1350	142	93	155	233	125	72	20
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	959	50	308	1406	148	97	161	243	130	75	21
RTOR Reduction (vph)	0	4	0	0	0	56	0	0	210	0	0	19
Lane Group Flow (vph)	0	1005	0	308	1406	92	0	258	33	0	205	2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		Over	Split		Perm
Protected Phases		4		3	8		6	6	3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		27.1		10.8	41.9	41.9		15.3	10.8		9.2	9.2
Effective Green, g (s)		27.1		10.8	41.9	41.9		15.3	10.8		9.2	9.2
Actuated g/C Ratio		0.35		0.14	0.53	0.53		0.20	0.14		0.12	0.12
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)		1214		473	1891	846		357	218		342	158
v/s Ratio Prot		c0.29		0.09	c0.40			c0.14	0.02		c0.07	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.83		0.65	0.74	0.11		0.72	0.15		0.60	0.02
Uniform Delay, d1		23.5		32.0	14.1	9.0		29.6	29.8		32.9	30.6
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.8		3.2	1.6	0.1		7.1	0.3		2.8	0.0
Delay (s)		28.3		35.2	15.7	9.1		36.6	30.1		35.7	30.6
Level of Service		C		D	B	A		D	C		D	C
Approach Delay (s)		28.3			18.4			33.5			35.2	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	78.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.99	1.00		0.97	1.00
Satd. Flow (prot)		3517		3433	3539	1583		1837	1583		2924	1346
Flt Permitted		1.00		0.95	1.00	1.00		0.99	1.00		0.97	1.00
Satd. Flow (perm)		3517		3433	3539	1583		1837	1583		2924	1346
Volume (vph)	0	918	39	289	1221	155	52	131	284	159	118	33
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	956	41	301	1272	161	54	136	296	166	123	34
RTOR Reduction (vph)	0	3	0	0	0	67	0	0	67	0	0	29
Lane Group Flow (vph)	0	994	0	301	1272	94	0	190	229	0	289	5
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	20%	20%	20%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		26.7		10.2	40.9	40.9		12.8	27.0		11.8	11.8
Effective Green, g (s)		26.7		10.2	40.9	40.9		12.8	27.0		11.8	11.8
Actuated g/C Ratio		0.34		0.13	0.53	0.53		0.17	0.35		0.15	0.15
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1212		452	1868	835		303	551		445	205
v/s Ratio Prot		c0.28		0.09	c0.36			c0.10	0.14		c0.10	
v/s Ratio Perm						0.06						0.00
v/c Ratio		0.82		0.67	0.68	0.11		0.63	0.42		0.65	0.03
Uniform Delay, d1		23.2		32.0	13.5	9.2		30.1	19.2		30.9	28.0
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		4.5		3.7	1.0	0.1		4.0	0.5		3.3	0.1
Delay (s)		27.7		35.7	14.5	9.3		34.1	19.7		34.2	28.0
Level of Service		C		D	B	A		C	B		C	C
Approach Delay (s)		27.7			17.7			25.4			33.5	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	77.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0	4.0		4.0	4.0		4.0	4.0
Lane Util. Factor		0.95		0.97	0.95	1.00		1.00	1.00		0.95	1.00
Frt		0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (prot)		3516		3433	3539	1583		1834	1583		3192	1468
Flt Permitted		1.00		0.95	1.00	1.00		0.98	1.00		0.97	1.00
Satd. Flow (perm)		3516		3433	3539	1583		1834	1583		3192	1468
Volume (vph)	0	1414	65	366	1022	166	88	191	500	195	152	35
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	1443	66	373	1043	169	90	195	510	199	155	36
RTOR Reduction (vph)	0	4	0	0	0	75	0	0	18	0	0	32
Lane Group Flow (vph)	0	1505	0	373	1043	94	0	285	492	0	354	4
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	10%	10%	10%
Turn Type				Prot		Perm	Split		pt+ov	Split		Perm
Protected Phases		4		3	8		6	6	6 3	2	2	
Permitted Phases						8						2
Actuated Green, G (s)		37.0		9.0	50.0	50.0		18.0	31.0		10.0	10.0
Effective Green, g (s)		37.0		9.0	50.0	50.0		18.0	31.0		10.0	10.0
Actuated g/C Ratio		0.41		0.10	0.56	0.56		0.20	0.34		0.11	0.11
Clearance Time (s)		4.0		4.0	4.0	4.0		4.0			4.0	4.0
Vehicle Extension (s)		3.0		3.0	3.0	3.0		3.0			3.0	3.0
Lane Grp Cap (vph)		1445		343	1966	879		367	545		355	163
v/s Ratio Prot		c0.43		0.11	0.29			0.16	c0.31		c0.11	
v/s Ratio Perm						0.06						0.00
v/c Ratio		1.04		1.09	0.53	0.11		0.78	0.90		1.09dl	0.02
Uniform Delay, d1		26.5		40.5	12.6	9.4		34.1	28.1		40.0	35.7
Progression Factor		1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2		35.4		74.0	0.3	0.1		9.9	18.1		46.7	0.1
Delay (s)		61.9		114.5	12.9	9.5		44.0	46.2		86.7	35.7
Level of Service		E		F	B	A		D	D		F	D
Approach Delay (s)		61.9			36.4			45.4			82.0	
Approach LOS		E			D			D			F	

Intersection Summary			
HCM Average Control Delay	51.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	155	1058	1369	15	0	141
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	163	1114	1441	16	0	148
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.72				0.77	0.72
vC, conflicting volume	1457				2332	728
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1242				1993	226
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	59				100	73
cM capacity (veh/h)	399				24	557

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	163	557	557	961	496	148
Volume Left	163	0	0	0	0	0
Volume Right	0	0	0	0	16	148
cSH	399	1700	1700	1700	1700	557
Volume to Capacity	0.41	0.33	0.33	0.57	0.29	0.27
Queue Length 95th (ft)	49	0	0	0	0	27
Control Delay (s)	20.1	0.0	0.0	0.0	0.0	13.8
Lane LOS	C					B
Approach Delay (s)	2.6			0.0		13.8
Approach LOS						B

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	164	989	1482	11	0	133
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	167	1009	1512	11	0	136
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		663	984			
pX, platoon unblocked	0.66				0.71	0.66
vC, conflicting volume	1523				2357	762
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1274				2014	114
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	53				100	77
cM capacity (veh/h)	355				19	602

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	167	505	505	1008	515	136
Volume Left	167	0	0	0	0	0
Volume Right	0	0	0	0	11	136
cSH	355	1700	1700	1700	1700	602
Volume to Capacity	0.47	0.30	0.30	0.59	0.30	0.23
Queue Length 95th (ft)	61	0	0	0	0	22
Control Delay (s)	23.9	0.0	0.0	0.0	0.0	12.7
Lane LOS	C					B
Approach Delay (s)	3.4			0.0		12.7
Approach LOS						B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Yield	
Grade		0%	0%		0%	
Volume (veh/h)	104	1460	1206	9	0	157
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	105	1475	1218	9	0	159
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)		657	984			
pX, platoon unblocked	0.82				0.81	0.82
vC, conflicting volume	1227				2170	614
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1058				1541	309
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	80				100	72
cM capacity (veh/h)	536				69	563

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	105	737	737	812	415	159
Volume Left	105	0	0	0	0	0
Volume Right	0	0	0	0	9	159
cSH	536	1700	1700	1700	1700	563
Volume to Capacity	0.20	0.43	0.43	0.48	0.24	0.28
Queue Length 95th (ft)	18	0	0	0	0	29
Control Delay (s)	13.3	0.0	0.0	0.0	0.0	13.9
Lane LOS	B					B
Approach Delay (s)	0.9			0.0		13.9
Approach LOS						B

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	131	44	26	264	193	98
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	154	52	31	311	227	115
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	599	227	342			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	599	227	342			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	94	97			
cM capacity (veh/h)	453	812	1217			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	154	52	341	227	115
Volume Left	154	0	31	0	0
Volume Right	0	52	0	0	115
cSH	453	812	1217	1700	1700
Volume to Capacity	0.34	0.06	0.03	0.13	0.07
Queue Length 95th (ft)	37	5	2	0	0
Control Delay (s)	17.0	9.7	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	15.2		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.9		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	142	28	25	286	234	120
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	158	31	28	318	260	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked						
vC, conflicting volume	633	260	393			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	633	260	393			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	96	98			
cM capacity (veh/h)	433	779	1165			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	158	31	346	260	133
Volume Left	158	0	28	0	0
Volume Right	0	31	0	0	133
cSH	433	779	1165	1700	1700
Volume to Capacity	0.36	0.04	0.02	0.15	0.08
Queue Length 95th (ft)	41	3	2	0	0
Control Delay (s)	18.0	9.8	0.9	0.0	0.0
Lane LOS	C	A	A		
Approach Delay (s)	16.7		0.9	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	82	32	48	319	342	165
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	102	40	60	399	428	206
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				856		
pX, platoon unblocked	0.98					
vC, conflicting volume	946	428	634			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	945	428	634			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	62	94	94			
cM capacity (veh/h)	267	627	949			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	102	40	459	428	206
Volume Left	102	0	60	0	0
Volume Right	0	40	0	0	206
cSH	267	627	949	1700	1700
Volume to Capacity	0.38	0.06	0.06	0.25	0.12
Queue Length 95th (ft)	43	5	5	0	0
Control Delay (s)	26.7	11.1	1.8	0.0	0.0
Lane LOS	D	B	A		
Approach Delay (s)	22.3		1.8	0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	7	159	0	1	4	152	199	12	161	2
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	8	187	0	1	4	179	234	14	189	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	407	640	190	531	524	296	192			413		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	407	640	190	531	524	296	192			413		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	58	100	100	100			99		
cM capacity (veh/h)	547	387	851	450	451	743	1382			1146		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	9	188	4	413	206
Volume Left	1	187	4	0	14
Volume Right	8	1	0	234	2
cSH	796	451	1382	1700	1146
Volume to Capacity	0.01	0.42	0.00	0.24	0.01
Queue Length 95th (ft)	1	51	0	0	1
Control Delay (s)	9.6	18.6	7.6	0.0	0.7
Lane LOS	A	C	A		A
Approach Delay (s)	9.6	18.6	0.1		0.7
Approach LOS	A	C			

Intersection Summary			
Average Delay	4.6		
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	1	0	12	171	0	8	5	166	249	17	168	1
Peak Hour Factor	0.92	0.92	0.92	0.85	0.92	0.85	0.92	0.85	0.85	0.85	0.85	0.92
Hourly flow rate (vph)	1	0	13	201	0	9	5	195	293	20	198	1
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	454	737	198	604	591	342	199			488		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	454	737	198	604	591	342	199			488		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	98	49	100	99	100			98		
cM capacity (veh/h)	501	338	843	397	410	701	1374			1075		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total	14	211	5	488	219
Volume Left	1	201	5	0	20
Volume Right	13	9	0	293	1
cSH	801	405	1374	1700	1075
Volume to Capacity	0.02	0.52	0.00	0.29	0.02
Queue Length 95th (ft)	1	73	0	0	1
Control Delay (s)	9.6	23.1	7.6	0.0	0.9
Lane LOS	A	C	A		A
Approach Delay (s)	9.6	23.1	0.1		0.9
Approach LOS	A	C			

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	2	7	253	0	1	7	193	247	6	242	3
Peak Hour Factor	0.92	0.92	0.92	0.89	0.92	0.89	0.92	0.89	0.89	0.89	0.89	0.92
Hourly flow rate (vph)	0	2	8	284	0	1	8	217	278	7	272	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								1222				
pX, platoon unblocked												
vC, conflicting volume	519	795	272	665	659	356	275			494		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	519	795	272	665	659	356	275			494		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	99	99	22	100	100	99			99		
cM capacity (veh/h)	463	316	767	365	379	688	1288			1069		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	285	8	494	279	3
Volume Left	0	284	8	0	7	0
Volume Right	8	1	0	278	0	3
cSH	582	365	1288	1700	1069	1700
Volume to Capacity	0.02	0.78	0.01	0.29	0.01	0.00
Queue Length 95th (ft)	1	162	0	0	0	0
Control Delay (s)	11.3	42.4	7.8	0.0	0.3	0.0
Lane LOS	B	E	A		A	
Approach Delay (s)	11.3	42.4	0.1		0.3	
Approach LOS	B	E				

Intersection Summary			
Average Delay	11.4		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5085		1770	1619			1803	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.75	1.00			0.82	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5085		1404	1619			1536	1583
Volume (vph)	26	1190	82	64	1534	0	50	4	26	4	2	19
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	27	1214	84	65	1565	0	51	4	27	4	2	19
RTOR Reduction (vph)	0	0	27	0	0	0	0	25	0	0	0	17
Lane Group Flow (vph)	27	1214	57	65	1565	0	51	6	0	0	6	2
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.3	50.8	50.8	6.2	53.7		6.3	6.3			6.3	6.3
Effective Green, g (s)	3.3	50.8	50.8	6.2	53.7		6.3	6.3			6.3	6.3
Actuated g/C Ratio	0.04	0.67	0.67	0.08	0.71		0.08	0.08			0.08	0.08
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	78	2388	1068	146	3626		117	135			129	132
v/s Ratio Prot	0.02	c0.34		c0.04	c0.31			0.00				
v/s Ratio Perm			0.04				c0.04				0.00	0.00
v/c Ratio	0.35	0.51	0.05	0.45	0.43		0.44	0.05			0.05	0.01
Uniform Delay, d1	35.0	6.1	4.1	32.9	4.5		32.8	31.7			31.7	31.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	2.7	0.2	0.0	2.2	0.1		2.6	0.1			0.1	0.0
Delay (s)	37.6	6.2	4.2	35.1	4.6		35.4	31.9			31.9	31.7
Level of Service	D	A	A	D	A		D	C			C	C
Approach Delay (s)		6.7			5.8			34.1			31.7	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.87			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5085		1770	1623			1779	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.73	1.00			0.70	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5085		1368	1623			1298	1583
Volume (vph)	30	1008	99	79	1489	0	91	8	47	31	2	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	1061	104	83	1567	0	96	8	49	33	2	77
RTOR Reduction (vph)	0	0	39	0	0	0	0	44	0	0	0	69
Lane Group Flow (vph)	32	1061	65	83	1567	0	96	13	0	0	35	8
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	3.0	42.0	42.0	5.9	44.9		7.1	7.1			7.1	7.1
Effective Green, g (s)	3.0	42.0	42.0	5.9	44.9		7.1	7.1			7.1	7.1
Actuated g/C Ratio	0.04	0.63	0.63	0.09	0.67		0.11	0.11			0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	79	2218	992	156	3408		145	172			138	168
v/s Ratio Prot	0.02	0.30		c0.05	c0.31			0.01				
v/s Ratio Perm			0.04				c0.07				0.03	0.01
v/c Ratio	0.41	0.48	0.07	0.53	0.46		0.66	0.08			0.25	0.05
Uniform Delay, d1	31.1	6.7	4.9	29.2	5.3		28.8	27.0			27.5	26.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	3.4	0.2	0.0	3.5	0.1		10.8	0.2			1.0	0.1
Delay (s)	34.5	6.8	4.9	32.7	5.4		39.6	27.2			28.5	27.0
Level of Service	C	A	A	C	A		D	C			C	C
Approach Delay (s)		7.4			6.7			35.0			27.5	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.86			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1770	3539	1583	1770	5085		1770	1598			1846	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.75	1.00			0.96	1.00
Satd. Flow (perm)	1770	3539	1583	1770	5085		1398	1598			1791	1583
Volume (vph)	18	1435	124	97	1122	0	140	4	72	2	9	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	18	1464	127	99	1145	0	143	4	73	2	9	21
RTOR Reduction (vph)	0	0	49	0	0	0	0	63	0	0	0	18
Lane Group Flow (vph)	18	1464	78	99	1145	0	143	14	0	0	11	3
Turn Type	Prot		Perm	Prot			Perm			Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases			4				2			6		6
Actuated Green, G (s)	1.7	48.4	48.4	7.3	54.0		11.3	11.3			11.3	11.3
Effective Green, g (s)	1.7	48.4	48.4	7.3	54.0		11.3	11.3			11.3	11.3
Actuated g/C Ratio	0.02	0.61	0.61	0.09	0.68		0.14	0.14			0.14	0.14
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	38	2168	970	164	3476		200	229			256	226
v/s Ratio Prot	0.01	c0.41		c0.06	0.23			0.01				
v/s Ratio Perm			0.05				c0.10				0.01	0.00
v/c Ratio	0.47	0.68	0.08	0.60	0.33		0.71	0.06			0.04	0.01
Uniform Delay, d1	38.2	10.1	6.2	34.5	5.1		32.3	29.3			29.2	29.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	9.0	0.8	0.0	6.1	0.1		11.5	0.1			0.1	0.0
Delay (s)	47.2	11.0	6.3	40.6	5.2		43.8	29.4			29.3	29.1
Level of Service	D	B	A	D	A		D	C			C	C
Approach Delay (s)		11.0			8.0			38.8			29.1	
Approach LOS		B			A			D			C	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	813	12	90	1609	19	8	21	26	2	10	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	838	12	93	1659	21	8	23	27	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1679			851			1865	2709	425	2302	2695	829
vC1, stage 1 conf vol							844	844		1844	1844	
vC2, stage 2 conf vol							1020	1865		457	851	
vCu, unblocked vol	1679			851			1865	2709	425	2302	2695	829
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			88			95	77	95	97	89	100
cM capacity (veh/h)	377			784			169	100	577	66	99	314

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	559	292	93	829	829	21	58	13
Volume Left	0	0	93	0	0	0	8	2
Volume Right	0	12	0	0	0	21	27	0
cSH	1700	1700	784	1700	1700	1700	179	92
Volume to Capacity	0.33	0.17	0.12	0.49	0.49	0.01	0.32	0.14
Queue Length 95th (ft)	0	0	10	0	0	0	33	12
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	0.0	34.5	50.7
Lane LOS			B				D	F
Approach Delay (s)	0.0		0.5				34.5	50.7
Approach LOS							D	F

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	891	50	71	1309	25	4	25	41	2	15	0
Peak Hour Factor	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	0	919	52	73	1349	27	4	27	42	2	16	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1377			970			1774	2467	485	2011	2466	675
vC1, stage 1 conf vol							944	944		1496	1496	
vC2, stage 2 conf vol							829	1523		515	970	
vCu, unblocked vol	1377			970			1774	2467	485	2011	2466	675
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			90			98	81	92	98	88	100
cM capacity (veh/h)	494			706			193	142	528	108	136	397

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	612	358	73	675	675	27	74	18
Volume Left	0	0	73	0	0	0	4	2
Volume Right	0	52	0	0	0	27	42	0
cSH	1700	1700	706	1700	1700	1700	251	132
Volume to Capacity	0.36	0.21	0.10	0.40	0.40	0.02	0.29	0.14
Queue Length 95th (ft)	0	0	9	0	0	0	30	12
Control Delay (s)	0.0	0.0	10.7	0.0	0.0	0.0	25.2	36.6
Lane LOS			B				D	E
Approach Delay (s)	0.0		0.5				25.2	36.6
Approach LOS							D	E

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	1557	18	26	1069	27	18	16	34	2	11	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	1605	19	27	1102	28	19	16	35	2	11	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1130			1624			2225	2798	812	2002	2779	551
vC1, stage 1 conf vol							1614	1614		1156	1156	
vC2, stage 2 conf vol							610	1184		846	1624	
vCu, unblocked vol	1130			1624			2225	2798	812	2002	2779	551
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			93			82	87	89	99	90	100
cM capacity (veh/h)	614			397			102	129	322	146	114	478

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	WB 4	NB 1	SB 1
Volume Total	1070	554	27	551	551	28	70	13
Volume Left	0	0	27	0	0	0	19	2
Volume Right	0	19	0	0	0	28	35	0
cSH	1700	1700	397	1700	1700	1700	168	118
Volume to Capacity	0.63	0.33	0.07	0.32	0.32	0.02	0.42	0.11
Queue Length 95th (ft)	0	0	5	0	0	0	47	9
Control Delay (s)	0.0	0.0	14.7	0.0	0.0	0.0	41.1	39.5
Lane LOS			B				E	E
Approach Delay (s)	0.0		0.3				41.1	39.5
Approach LOS							E	E

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	448	0	12	380	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	487	0	13	413	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			487		926	487
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			487		926	487
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	93
cM capacity (veh/h)			1076		295	581

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	487	13	413	42
Volume Left	0	13	0	0
Volume Right	0	0	0	42
cSH	1700	1076	1700	581
Volume to Capacity	0.29	0.01	0.24	0.07
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.4	0.0	11.7
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.7
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	498	0	17	351	0	39
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	541	0	18	382	0	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			541		960	541
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			541		960	541
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		100	92
cM capacity (veh/h)			1027		280	541

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	541	18	382	42
Volume Left	0	18	0	0
Volume Right	0	0	0	42
cSH	1700	1027	1700	541
Volume to Capacity	0.32	0.02	0.22	0.08
Queue Length 95th (ft)	0	1	0	6
Control Delay (s)	0.0	8.6	0.0	12.2
Lane LOS		A		B
Approach Delay (s)	0.0	0.4		12.2
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	573	0	13	477	0	44
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	591	0	13	492	0	45
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			591		1109	591
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			591		1109	591
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	91
cM capacity (veh/h)			985		229	507

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	591	13	492	45
Volume Left	0	13	0	0
Volume Right	0	0	0	45
cSH	1700	985	1700	507
Volume to Capacity	0.35	0.01	0.29	0.09
Queue Length 95th (ft)	0	1	0	7
Control Delay (s)	0.0	8.7	0.0	12.8
Lane LOS		A		B
Approach Delay (s)	0.0	0.2		12.8
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	40.2%	ICU Level of Service	A
Analysis Period (min)	15		

CUMULATIVE PLUS PROJECT CONDITIONS (ALTERNATIVE A) WITH MITIGATION

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00			1.00	1.00
Frt	1.00	0.95		1.00	1.00		1.00	0.91			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (prot)	1770	4814		1770	5076		3433	1704			1812	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.97	1.00
Satd. Flow (perm)	1770	4814		1770	5076		3433	1704			1812	1583
Volume (vph)	39	1276	705	59	1533	19	589	22	28	24	19	23
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	40	1302	719	60	1564	19	601	22	29	24	19	23
RTOR Reduction (vph)	0	104	0	0	1	0	0	22	0	0	0	22
Lane Group Flow (vph)	40	1917	0	60	1582	0	601	29	0	0	43	1
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												2
Actuated Green, G (s)	2.9	35.1		2.9	35.1		17.7	17.7			1.9	1.9
Effective Green, g (s)	2.9	35.1		2.9	35.1		17.7	17.7			1.9	1.9
Actuated g/C Ratio	0.04	0.48		0.04	0.48		0.24	0.24			0.03	0.03
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	70	2296		70	2421		826	410			47	41
v/s Ratio Prot	0.02	c0.40		c0.03	0.31		c0.18	0.02			c0.02	
v/s Ratio Perm												0.00
v/c Ratio	0.57	0.83		0.86	0.65		0.73	0.07			0.91	0.01
Uniform Delay, d1	34.7	16.7		35.1	14.6		25.7	21.6			35.8	34.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	10.8	2.8		60.4	0.6		3.2	0.1			98.6	0.1
Delay (s)	45.5	19.5		95.6	15.3		29.0	21.7			134.4	35.1
Level of Service	D	B		F	B		C	C			F	D
Approach Delay (s)		20.0			18.2			28.4			99.8	
Approach LOS		C			B			C			F	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4774		1770	5019		3433	1762		1770	1678	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4774		1770	5019		3433	1762		1770	1678	
Volume (vph)	224	928	638	70	1447	137	548	120	68	142	91	179
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	238	987	679	74	1539	146	583	128	72	151	97	190
RTOR Reduction (vph)	0	133	0	0	12	0	0	23	0	0	79	0
Lane Group Flow (vph)	238	1533	0	74	1673	0	583	177	0	151	208	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	13.0	40.1		4.8	31.9		16.8	16.8		12.6	12.6	
Effective Green, g (s)	13.0	40.1		4.8	31.9		16.8	16.8		12.6	12.6	
Actuated g/C Ratio	0.14	0.44		0.05	0.35		0.19	0.19		0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	255	2120		94	1773		639	328		247	234	
v/s Ratio Prot	c0.13	0.32		0.04	c0.33		c0.17	0.10		0.09	c0.12	
v/s Ratio Perm												
v/c Ratio	0.93	0.72		0.79	0.94		0.91	0.54		0.61	0.89	
Uniform Delay, d1	38.2	20.6		42.2	28.3		36.0	33.3		36.5	38.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.5	1.2		34.1	10.8		17.4	1.8		4.4	30.7	
Delay (s)	76.7	21.8		76.3	39.1		53.4	35.1		41.0	68.8	
Level of Service	E	C		E	D		D	D		D	E	
Approach Delay (s)		28.7			40.7			48.7			59.2	
Approach LOS		C			D			D			E	

Intersection Summary			
HCM Average Control Delay	38.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91		0.97	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00		1.00	0.88		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	4838		1770	5080		3433	1632		1770	1745	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	4838		1770	5080		3433	1632		1770	1745	
Volume (vph)	24	1498	718	34	1228	8	883	10	46	28	28	21
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	24	1529	733	35	1253	8	901	10	47	29	29	21
RTOR Reduction (vph)	0	81	0	0	1	0	0	33	0	0	20	0
Lane Group Flow (vph)	24	2181	0	35	1260	0	901	24	0	29	30	0
Turn Type	Prot			Prot			Split			Split		
Protected Phases	7	4		3	8		6	6		2	2	
Permitted Phases												
Actuated Green, G (s)	1.8	46.3		2.2	46.7		27.8	27.8		3.0	3.0	
Effective Green, g (s)	1.8	46.3		2.2	46.7		27.8	27.8		3.0	3.0	
Actuated g/C Ratio	0.02	0.49		0.02	0.49		0.29	0.29		0.03	0.03	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	33	2350		41	2489		1001	476		56	55	
v/s Ratio Prot	0.01	c0.45		c0.02	0.25		c0.26	0.01		0.02	c0.02	
v/s Ratio Perm												
v/c Ratio	0.73	0.93		0.85	0.51		0.90	0.05		0.52	0.54	
Uniform Delay, d1	46.5	22.9		46.4	16.5		32.4	24.3		45.4	45.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	56.6	7.1		85.0	0.2		10.9	0.0		7.9	9.8	
Delay (s)	103.1	30.0		131.4	16.6		43.4	24.3		53.3	55.3	
Level of Service	F	C		F	B		D	C		D	E	
Approach Delay (s)		30.8			19.7			42.2			54.5	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	30.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	95.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	132	584	161	262	585	204	175	1125	527	329	951	115
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	615	169	276	616	215	184	1184	555	346	1001	121
RTOR Reduction (vph)	0	0	134	0	0	172	0	0	154	0	0	75
Lane Group Flow (vph)	139	615	35	276	616	43	184	1184	401	346	1001	46
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.8	18.1	18.1	8.0	17.3	17.3	12.0	34.1	34.1	10.8	32.9	32.9
Effective Green, g (s)	8.8	18.1	18.1	8.0	17.3	17.3	12.0	34.1	34.1	10.8	32.9	32.9
Actuated g/C Ratio	0.10	0.21	0.21	0.09	0.20	0.20	0.14	0.39	0.39	0.12	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	736	329	316	704	315	244	1387	620	426	1338	599
v/s Ratio Prot	0.08	0.17		c0.08	c0.17		c0.10	c0.33		0.10	0.28	
v/s Ratio Perm			0.02			0.03			0.25			0.03
v/c Ratio	0.78	0.84	0.11	0.87	0.88	0.14	0.75	0.85	0.65	0.81	0.75	0.08
Uniform Delay, d1	38.1	33.0	27.9	39.0	33.8	28.7	36.1	24.2	21.5	37.1	23.5	17.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.8	8.2	0.1	22.4	11.7	0.2	12.4	5.3	2.3	11.2	2.3	0.1
Delay (s)	56.9	41.2	28.0	61.4	45.5	28.9	48.5	29.5	23.9	48.3	25.8	17.4
Level of Service	E	D	C	E	D	C	D	C	C	D	C	B
Approach Delay (s)		41.1			46.2			29.7			30.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	87.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	127	592	138	196	571	168	105	1088	520	363	1055	117
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	604	141	200	583	171	107	1110	531	370	1077	119
RTOR Reduction (vph)	0	0	111	0	0	138	0	0	155	0	0	66
Lane Group Flow (vph)	130	604	30	200	583	33	107	1110	376	370	1077	53
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.6	18.3	18.3	7.1	16.8	16.8	6.1	33.2	33.2	11.5	38.6	38.6
Effective Green, g (s)	8.6	18.3	18.3	7.1	16.8	16.8	6.1	33.2	33.2	11.5	38.6	38.6
Actuated g/C Ratio	0.10	0.21	0.21	0.08	0.20	0.20	0.07	0.39	0.39	0.13	0.45	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	752	336	283	691	309	125	1365	610	459	1587	710
v/s Ratio Prot	c0.07	c0.17		0.06	0.16		0.06	c0.31		c0.11	0.30	
v/s Ratio Perm			0.02			0.02			0.24			0.03
v/c Ratio	0.73	0.80	0.09	0.71	0.84	0.11	0.86	0.81	0.62	0.81	0.68	0.08
Uniform Delay, d1	37.6	32.2	27.2	38.5	33.4	28.5	39.6	23.7	21.3	36.2	18.8	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.6	6.2	0.1	7.8	9.2	0.2	40.2	3.8	1.9	10.0	1.2	0.0
Delay (s)	52.2	38.4	27.3	46.3	42.6	28.6	79.7	27.5	23.2	46.2	20.0	13.6
Level of Service	D	D	C	D	D	C	E	C	C	D	C	B
Approach Delay (s)		38.7			40.9			29.4			25.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	86.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	1770	3539	1583	3433	3539	1583
Volume (vph)	153	606	63	713	683	199	112	889	439	473	577	141
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	659	68	775	742	216	122	966	477	514	627	153
RTOR Reduction (vph)	0	0	56	0	0	155	0	0	290	0	0	106
Lane Group Flow (vph)	166	659	12	775	742	61	122	966	187	514	627	47
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.6	16.0	16.0	20.0	25.4	25.4	10.4	25.0	25.0	13.0	27.6	27.6
Effective Green, g (s)	10.6	16.0	16.0	20.0	25.4	25.4	10.4	25.0	25.0	13.0	27.6	27.6
Actuated g/C Ratio	0.12	0.18	0.18	0.22	0.28	0.28	0.12	0.28	0.28	0.14	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	208	629	281	763	999	447	205	983	440	496	1085	485
v/s Ratio Prot	0.09	c0.19		c0.23	0.21		0.07	c0.27		c0.15	c0.18	
v/s Ratio Perm			0.01			0.04			0.12			0.03
v/c Ratio	0.80	1.05	0.04	1.02	0.74	0.14	0.60	0.98	0.43	1.04	0.58	0.10
Uniform Delay, d1	38.7	37.0	30.7	35.0	29.3	24.1	37.8	32.3	26.6	38.5	26.3	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.9	49.0	0.1	36.6	3.0	0.1	4.6	24.4	0.7	50.1	0.8	0.1
Delay (s)	57.5	86.0	30.7	71.6	32.4	24.3	42.4	56.7	27.3	88.6	27.0	22.4
Level of Service	E	F	C	E	C	C	D	E	C	F	C	C
Approach Delay (s)		76.5			48.9			46.6			50.9	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	53.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	88.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.94			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.99	
Satd. Flow (prot)	1770	3532		1770	3539	1583		1734			1849	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.95			0.97	
Satd. Flow (perm)	1770	3532		1770	3539	1583		1656			1811	
Volume (vph)	448	813	12	90	1609	19	8	21	26	2	10	0
Peak-hour factor, PHF	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Adj. Flow (vph)	487	838	12	93	1659	21	8	23	27	2	11	0
RTOR Reduction (vph)	0	1	0	0	0	10	0	26	0	0	0	0
Lane Group Flow (vph)	487	849	0	93	1659	11	0	32	0	0	13	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	25.0	61.0		7.0	43.0	43.0		3.6			3.6	
Effective Green, g (s)	25.0	61.0		7.0	43.0	43.0		3.6			3.6	
Actuated g/C Ratio	0.30	0.73		0.08	0.51	0.51		0.04			0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	529	2577		148	1820	814		71			78	
v/s Ratio Prot	c0.28	0.24		0.05	c0.47							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.92	0.33		0.63	0.91	0.01		0.45			0.17	
Uniform Delay, d1	28.3	4.0		37.0	18.6	9.9		39.0			38.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	21.5	0.1		8.1	7.4	0.0		4.5			1.0	
Delay (s)	49.8	4.1		45.1	25.9	9.9		43.6			39.6	
Level of Service	D	A		D	C	A		D			D	
Approach Delay (s)		20.8			26.7			43.6			39.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	0.99		1.00	1.00	0.85		0.92			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00			0.99	
Satd. Flow (prot)	1770	3511		1770	3539	1583		1713			1852	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.96	
Satd. Flow (perm)	1770	3511		1770	3539	1583		1681			1789	
Volume (vph)	489	891	50	71	1309	25	4	25	41	2	15	0
Peak-hour factor, PHF	0.92	0.97	0.97	0.97	0.97	0.92	0.97	0.92	0.97	0.92	0.92	0.92
Adj. Flow (vph)	532	919	52	73	1349	27	4	27	42	2	16	0
RTOR Reduction (vph)	0	4	0	0	0	15	0	40	0	0	0	0
Lane Group Flow (vph)	532	967	0	73	1349	12	0	33	0	0	18	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	26.5	56.1		6.0	35.6	35.6		4.2			4.2	
Effective Green, g (s)	26.5	56.1		6.0	35.6	35.6		4.2			4.2	
Actuated g/C Ratio	0.34	0.72		0.08	0.45	0.45		0.05			0.05	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	599	2516		136	1609	720		90			96	
v/s Ratio Prot	c0.30	0.28		0.04	c0.38							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.89	0.38		0.54	0.84	0.02		0.37			0.19	
Uniform Delay, d1	24.5	4.3		34.8	18.8	11.7		35.8			35.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	14.9	0.1		4.0	4.0	0.0		2.6			0.9	
Delay (s)	39.4	4.4		38.8	22.8	11.7		38.3			36.4	
Level of Service	D	A		D	C	B		D			D	
Approach Delay (s)		16.8			23.4			38.3			36.4	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	20.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00			1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.93			1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99			0.99	
Satd. Flow (prot)	1770	3533		1770	3539	1583		1714			1849	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.91			0.98	
Satd. Flow (perm)	1770	3533		1770	3539	1583		1577			1818	
Volume (vph)	573	1557	18	26	1069	27	18	16	34	2	11	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	591	1605	19	27	1102	28	19	16	35	2	11	0
RTOR Reduction (vph)	0	1	0	0	0	16	0	34	0	0	0	0
Lane Group Flow (vph)	591	1623	0	27	1102	12	0	36	0	0	13	0
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases						8	2			6		
Actuated Green, G (s)	27.4	56.5		1.5	30.6	30.6		2.8			2.8	
Effective Green, g (s)	27.4	56.5		1.5	30.6	30.6		2.8			2.8	
Actuated g/C Ratio	0.38	0.78		0.02	0.42	0.42		0.04			0.04	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	666	2742		36	1488	665		61			70	
v/s Ratio Prot	c0.33	0.46		0.02	c0.31							
v/s Ratio Perm						0.01		c0.02			0.01	
v/c Ratio	0.89	0.59		0.75	0.74	0.02		0.60			0.19	
Uniform Delay, d1	21.3	3.4		35.5	17.8	12.3		34.4			33.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	13.6	0.3		59.8	2.0	0.0		14.7			1.3	
Delay (s)	34.8	3.7		95.2	19.8	12.3		49.1			35.2	
Level of Service	C	A		F	B	B		D			D	
Approach Delay (s)		12.0			21.4			49.1			35.2	
Approach LOS		B			C			D			D	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

APPENDIX E

SIGNAL WARRANT ANALYSIS

TRAFFIC SIGNAL WARRANTS
EIGHT-HOUR VEHICULAR VOLUME (MUTCD Warrant 1, Caltrans Warrants 1, 2 & 8)

Major Street: Hana Hwy westbound
Minor Street: Hana Hwy eastbound left onto Haleakala Hwy
Scenario: Cumulative plus Project Alternative A - AM
Urban/Rural: u (U=urban, R=rural or high speed [c])

MINIMUM VEHICULAR VOLUME
(MUTCD Condition A, Caltrans Warrant 1)

Number of Lanes on Each Approach	
Major Street:	2
Minor Street:	1
Vehicles Per Hour (8th Highest Hour)	
Major Street (Approach 1):	774
Major Street (Approach 2):	1,033
Major Street Left Turn (see note [d]):	269
Minor Street (Higher Volume App.):	33
MINIMUM VEHICULAR VOLUME SATISFIED?	**YES**

Minimum Requirements

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour (eighth highest hour) on Major Street (Total of Both Approaches)			Vehicles Per Hour (eighth highest hour) on Higher-Volume Minor Street Approach (1 Direction Only)		
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	100% [a]	80% [b]	70% [c]
1	1	500	400	350	150	120	105
>=2	1	600	480	420	150	120	105
>=2	>=2	600	480	420	200	160	140
1	>=2	500	400	350	200	160	140
Minimum Required		600	480	#N/A	150	120	#N/A
Test Amount		1,807	1,807	#N/A	302	302	#N/A

INTERRUPTION OF CONTINUOUS TRAFFIC
(MUTCD Condition B, Caltrans Warrant 2)

Number of Lanes on Each Approach	
Major Street:	2
Minor Street:	1
Vehicles Per Hour (8th Highest Hour)	
Major Street (Approach 1):	774
Major Street (Approach 2):	1,033
Major Street Left Turn (see note [d]):	269
Minor Street (Higher Volume App.):	33
INTERRUPT. OF CONT. TRAFFIC SATISFIED?	**YES**

Minimum Requirements

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour (eighth highest hour) on Major Street (Total of Both Approaches)			Vehicles Per Hour (eighth highest hour) on Higher-Volume Minor Street Approach (1 Direction Only)		
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	100% [a]	80% [b]	70% [c]
1	1	750	600	525	75	60	53
>=2	1	900	720	630	75	60	53
>=2	>=2	900	720	630	100	80	70
1	>=2	750	600	525	100	80	70
Minimum Required		900	720	#N/A	75	60	#N/A
Test Amount		1,807	1,807	#N/A	302	302	#N/A

80% COMBINATION (Caltrans Warrant 8)

No one warrant satisfied but following warrants fulfilled 80% or more:

Condition A 80% Fulfilled?	YES
Condition B 80% Fulfilled?	YES
80% COMBINATION SATISFIED?	**YES**

Minimum Requirements:
Conditions A and B Both 80% Fulfilled

Notes:
a. Basic minimum hourly volume (eighth highest hour).
b. Used for combination of Conditions A and B.
c. May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.
d. Heavier left-turn movement from the major street may be included with minor street volume if a separate signal phase is proposed for left-turn movements.

Adopted from: U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices, Millennium Edition*, 2001; and Caltrans, *Traffic Manual,* 2002.

TRAFFIC SIGNAL WARRANTS
FOUR HOUR VEHICULAR VOLUME (MUTCD Warrant 2, Caltrans Warrant 9)
PEAK HOUR VEHICULAR VOLUME (MUTCD Warrant 3, Caltrans Warrant 11)

Major Street:	Hana Hwy westbound
Minor Street:	Hana Hwy eastbound left onto Haleakala Hwy
Scenario:	Cumulative plus Project Alternative A - AM
Urban/Rural:	u (U=urban, R=rural [a])

FOUR HOUR VOLUME (MUTCD Warrant 2, Caltrans Warrant 9)

Number of Lanes on Each Approach			
Major Street:	2		
Minor Street:	1		
Vehicles Per Hour (4th Highest Hour)			
Major Street (Approach 1):	1,097	Major Street Left Turn (see note [b]):	382
Major Street (Approach 2):	1,464	Minor Street (Higher Volume App.):	47
Major Street Total (Both Approaches):	2,561	Minor Street Total:	429
Minimum Volume on Major Street to Satisfy Warrant (see note [c]):	390	Minimum Volume on Minor Street to Satisfy Warrant (see note [c]):	80

FOUR HOUR VOLUME WARRANT SATISFIED? **YES**

PEAK HOUR VOLUME (MUTCD Warrant 3, Caltrans Warrant 11)

Number of Lanes on Each Approach			
Major Street:	2		
Minor Street:	1		
Vehicles Per Hour (Peak Hour)			
Major Street (Approach 1):	1,290	Major Street Left Turn (see note [b]):	449
Major Street (Approach 2):	1,722	Minor Street (Higher Volume App.):	55
Major Street Total (Both Approaches):	3,012	Minor Street Total:	504
Minimum Volume on Major Street to Satisfy Warrant (see note [d]):	510	Minimum Volume on Minor Street to Satisfy Warrant (see note [d]):	100

PEAK HOUR VOLUME WARRANT SATISFIED? **YES**

Notes:

a. May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

b. Heavier left-turn movement from the major street may be included with minor street volume if a separate signal phase is proposed for left-turn movements.

c. From: USDOT, FHWA, "Manual on Uniform Traffic Control Devices," 2001, Figure 4C-1.

d. From: USDOT, FHWA, "Manual on Uniform Traffic Control Devices," 2001, Figure 4C-3.

Adopted from: U.S. Department of Transportation, Federal Highway Administration, "Manual on Uniform Traffic Control Devices, Millennium Edition," 2001; and Caltrans, "Traffic Manual," 2002.

SUMMARY OF TRAFFIC SIGNAL WARRANT ANALYSIS

Major Street: Hana Hwy westbound
Minor Street: Hana Hwy eastbound left onto Haleakala Hwy
Scenario: Cumulative plus Project Alternative A - AM

SUMMARY OF RESULTS

Warrant	MUTCD Warrant Number	Caltrans Warrant Number	Requested for Analysis?	Volumes Satisfy Warrant?	Applicable Time Period
Eight Hour Vehicular Volume	1				
Minimum Vehicular Volume	1A	1	YES	YES	8th Highest Hour
Interruption of Continuous Traffic	1B	2	YES	YES	8th Highest Hour
80% Combination	1C	8	YES	YES	8th Highest Hour
Four Hour Volume	2	9	YES	YES	4th Highest Hour
Peak Hour Volume	3	11	YES	YES	Peak Hour
Estimated Average Daily Traffic	n/a	n/a			
Minimum Vehicular Volume			NO	n/a	Daily
Interruption of Continuous Traffic			NO	n/a	Daily
80% Combination			NO	n/a	Daily

TRAFFIC SIGNAL WARRANTS
EIGHT-HOUR VEHICULAR VOLUME (MUTCD Warrant 1, Caltrans Warrants 1, 2 & 8)

Major Street: Hana Hwy westbound
Minor Street: Hana Hwy eastbound left onto Haleakala Hwy
Scenario: Cumulative plus Project Alternative A - AM
Urban/Rural: u (U=urban, R=rural or high speed [c])

MINIMUM VEHICULAR VOLUME
(MUTCD Condition A, Caltrans Warrant 1)

Number of Lanes on Each Approach	
Major Street:	2
Minor Street:	1
Vehicles Per Hour (8th Highest Hour)	
Major Street (Approach 1):	764
Major Street (Approach 2):	1,031
Major Street Left Turn (see note [d]):	269
Minor Street (Higher Volume App.):	33
MINIMUM VEHICULAR VOLUME SATISFIED?	**YES**

Minimum Requirements

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour (eighth highest hour) on Major Street (Total of Both Approaches)			Vehicles Per Hour (eighth highest hour) on Higher-Volume Minor Street Approach (1 Direction Only)		
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	100% [a]	80% [b]	70% [c]
1	1	500	400	350	150	120	105
>=2	1	600	480	420	150	120	105
>=2	>=2	600	480	420	200	160	140
1	>=2	500	400	350	200	160	140
Minimum Required		600	480	#N/A	150	120	#N/A
Test Amount		1,795	1,795	#N/A	302	302	#N/A

INTERRUPTION OF CONTINUOUS TRAFFIC
(MUTCD Condition B, Caltrans Warrant 2)

Number of Lanes on Each Approach	
Major Street:	2
Minor Street:	1
Vehicles Per Hour (8th Highest Hour)	
Major Street (Approach 1):	764
Major Street (Approach 2):	1,031
Major Street Left Turn (see note [d]):	269
Minor Street (Higher Volume App.):	33
INTERRUPT. OF CONT. TRAFFIC SATISFIED?	**YES**

Minimum Requirements

Number of Lanes for Moving Traffic on Each Approach		Vehicles Per Hour (eighth highest hour) on Major Street (Total of Both Approaches)			Vehicles Per Hour (eighth highest hour) on Higher-Volume Minor Street Approach (1 Direction Only)		
Major Street	Minor Street	100% [a]	80% [b]	70% [c]	100% [a]	80% [b]	70% [c]
1	1	750	600	525	75	60	53
>=2	1	900	720	630	75	60	53
>=2	>=2	900	720	630	100	80	70
1	>=2	750	600	525	100	80	70
Minimum Required		900	720	#N/A	75	60	#N/A
Test Amount		1,795	1,795	#N/A	302	302	#N/A

80% COMBINATION (Caltrans Warrant 8)

No one warrant satisfied but following warrants fulfilled 80% or more:

Condition A 80% Fulfilled?	YES
Condition B 80% Fulfilled?	YES
80% COMBINATION SATISFIED?	**YES**

Minimum Requirements:
Conditions A and B Both 80% Fulfilled

Notes:
a. Basic minimum hourly volume (eighth highest hour).
b. Used for combination of Conditions A and B.
c. May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.
d. Heavier left-turn movement from the major street may be included with minor street volume if a separate signal phase is proposed for left-turn movements.

Adopted from: U.S. Department of Transportation, Federal Highway Administration, *Manual on Uniform Traffic Control Devices, Millennium Edition*, 2001; and Caltrans, *Traffic Manual,* 2002.

TRAFFIC SIGNAL WARRANTS
FOUR HOUR VEHICULAR VOLUME (MUTCD Warrant 2, Caltrans Warrant 9)
PEAK HOUR VEHICULAR VOLUME (MUTCD Warrant 3, Caltrans Warrant 11)

Major Street:	Hana Hwy westbound
Minor Street:	Hana Hwy eastbound left onto Haleakala Hwy
Scenario:	Cumulative plus Project Alternative A - AM
Urban/Rural:	u (U=urban, R=rural [a])

FOUR HOUR VOLUME (MUTCD Warrant 2, Caltrans Warrant 9)

Number of Lanes on Each Approach			
Major Street:	2		
Minor Street:	1		
Vehicles Per Hour (4th Highest Hour)			
Major Street (Approach 1):	1,082	Major Street Left Turn (see note [b]):	381
Major Street (Approach 2):	1,460	Minor Street (Higher Volume App.):	47
Major Street Total (Both Approaches):	2,542	Minor Street Total:	428
Minimum Volume on Major Street to Satisfy Warrant (see note [c]):	390	Minimum Volume on Minor Street to Satisfy Warrant (see note [c]):	80

FOUR HOUR VOLUME WARRANT SATISFIED? **YES**

PEAK HOUR VOLUME (MUTCD Warrant 3, Caltrans Warrant 11)

Number of Lanes on Each Approach			
Major Street:	2		
Minor Street:	1		
Vehicles Per Hour (Peak Hour)			
Major Street (Approach 1):	1,273	Major Street Left Turn (see note [b]):	448
Major Street (Approach 2):	1,718	Minor Street (Higher Volume App.):	55
Major Street Total (Both Approaches):	2,991	Minor Street Total:	503
Minimum Volume on Major Street to Satisfy Warrant (see note [d]):	510	Minimum Volume on Minor Street to Satisfy Warrant (see note [d]):	100

PEAK HOUR VOLUME WARRANT SATISFIED? **YES**

Notes:

a. May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000.

b. Heavier left-turn movement from the major street may be included with minor street volume if a separate signal phase is proposed for left-turn movements.

c. From: USDOT, FHWA, "Manual on Uniform Traffic Control Devices," 2001, Figure 4C-1.

d. From: USDOT, FHWA, "Manual on Uniform Traffic Control Devices," 2001, Figure 4C-3.

Adopted from: U.S. Department of Transportation, Federal Highway Administration, "Manual on Uniform Traffic Control Devices, Millennium Edition," 2001; and Caltrans, "Traffic Manual," 2002.

SUMMARY OF TRAFFIC SIGNAL WARRANT ANALYSIS

Major Street: Hana Hwy westbound
Minor Street: Hana Hwy eastbound left onto Haleakala Hwy
Scenario: Cumulative plus Project Alternative A - AM

SUMMARY OF RESULTS

Warrant	MUTCD Warrant Number	Caltrans Warrant Number	Requested for Analysis?	Volumes Satisfy Warrant?	Applicable Time Period
Eight Hour Vehicular Volume	1				
Minimum Vehicular Volume	1A	1	YES	YES	8th Highest Hour
Interruption of Continuous Traffic	1B	2	YES	YES	8th Highest Hour
80% Combination	1C	8	YES	YES	8th Highest Hour
Four Hour Volume	2	9	YES	YES	4th Highest Hour
Peak Hour Volume	3	11	YES	YES	Peak Hour
Estimated Average Daily Traffic	n/a	n/a			
Minimum Vehicular Volume			NO	n/a	Daily
Interruption of Continuous Traffic			NO	n/a	Daily
80% Combination			NO	n/a	Daily

APPENDIX C

Memo from Fehr & Peers / Kaku Associates
January 30, 2008

FEHR & PEERS
KAKU ASSOCIATES

MEMORANDUM

TO: Sue Sakai, Belt Collins

CC: Dean Watase, Hawaii Department of Transportation, Harbors Division
Bill Wynhoff, State of Hawaii

FROM: Dick Kaku, Eugene Tang, Michael Kennedy and Miguel Núñez

DATE: January 30, 2008

SUBJECT: Kahului Harbor Supplemental EA for 2015 **Ref:** LA07-2191

Fehr & Peers/Kaku Associates analyzed current traffic conditions in the vicinity of Kahului Harbor on the island of Maui to assess the impact of the Hawaii Superferry (HSF) on traffic operations on the local street system. The analysis includes an assessment of existing traffic operations on the streets that provide access to the portion of Kahului Harbor that houses the HSF terminal, a discussion of ferry operations as it loaded and unloaded passenger vehicles during its initial period of operation in mid-January 2008, and an evaluation of the traffic conditions at two key intersections under projected conditions with the addition of a maximum passenger load on the ferry.

STUDY INTERSECTIONS

The HSF terminal is on Pier 2 of Kahului Harbor in Kahului, Maui, Hawaii. Access to Pier 2 is provided by two intersections along Ka'ahumanu Avenue, both of which are signalized:

- Ka'ahumanu Avenue & Pu'unene Avenue
- Ka'ahumanu Avenue & Wharf Street

Peak period turning movement traffic counts were conducted in April 2007 at the two study intersections during the following time periods:

- AM (7:00 - 9:00 AM)
- Mid-AM (9:00 -11:00 AM)
- PM (3:30 - 5:30 PM)

201 Santa Monica Blvd, Ste 500
Santa Monica, CA 90401
T: (310) 458-9916
F: (310) 394-7663
fehrandpeers.com

An additional series of traffic counts were collected at the study intersections in January 2008 for the following time period:

- Late PM (5:00 PM-8:00 PM)

In order to reflect 2008 conditions, the year 2007 traffic counts were adjusted by growth rates that reflect the changes on each street during the period from April 2007 to today. The growth rate is consistent with the annualized number used in the planning studies conducted for the Kahului Harbor Master Plan environmental assessments for the Hawaii Department of Transportation (HDOT). The specific rates are 1% per year for Ka'ahumanu Avenue and 3% per year for Pu'unene Avenue.

All counts except the 2008 counts were conducted prior to the initial commencement of HSF service into and out of Kahului Harbor in November 2007, and after its stoppage but prior to its re-commencement on Jaunary 13, 2008.

EXISTING CONDITIONS LEVEL OF SERVICE

Level of service (LOS) is a qualitative measure used to describe the condition of traffic flow ranging from excellent conditions (LOS A) to overloaded conditions (LOS F). The level of service definitions for signalized intersections are provided in Table 1. LOS D is typically considered the minimum acceptable LOS in urban areas and is, therefore, used for this analysis.

LOS analyses were conducted at both study intersections to determine existing operating conditions for each of the time periods using the operations methodology for signalized intersections from *2000 Highway Capacity Manual* (2000 HCM) (Transportation Research Board, 2000).

Table 2 presents the existing LOS for both study intersections during all four time periods, indicating that both intersections operate at LOS C or better during each peak hour. The intersection delay at Ka'ahumanu Avenue & Pu'unene Avenue ranges between 18 and 27 seconds. The delay at the intersection of Ka'ahumanu Avenue & Wharf Street ranges between seven and 12 seconds.

Both intersections operate at an acceptable LOS during each of the four time periods.

OBSERVATIONS

As part of a broader analysis of operation of the ferry being conducted as part of the Rapid Risk Assessment of the HSF for HDOT in compliance with the legislation that authorized commencement of its services, field observations of the HSF were conducted at the Kahului Harbor. These observations were performed between January 20 and 23, with a focus on potential traffic operational issues caused by the loading and unloading of passenger vehicles

onto and off of the HSF. At the time of the observations, only two scheduled sailings took place each day at Kahului Harbor: the 10:15 AM arrival from Honolulu and the 11:15 AM departure to Honolulu. Published information for the HSF indicates that the facility gates are opened approximately two hours prior to departure and closed approximately 30 minutes prior to departure. The field observations were performed for the entire period around the overlapping arrival and departure times, i.e., from 9:15 to 10:45 AM each day.

HSF Patronage

Actual passenger loads were provided by HSF staff for the four days when observations of ferry operations were made. The highest demand was observed on Monday, January 21 (Martin Luther King, Jr. holiday) with 135 vehicles, of which 41 were returning to Kahului and 94 were departing from Kahului. Based on conversations with staff, this was the highest demand to date since HSF service restarted after its stoppage in November 2007. The remainder of the observations showed total vehicular demand ranging from 59 vehicles to 80 vehicles with an average split of 40% returning to Kahului and 60% departing from Kahului.

Summary of Observations

The following summarizes the key points relative to the traffic impact of the loading and unloading of passenger vehicles onto and off of the ferry:

- Traffic Control Officers (TCOs) were positioned at Ka'ahumanu & Pu'unene to direct traffic.

- Gates were generally opened by 9:00 AM each day.

- On each day, most departing vehicles, i.e., vehicles planning to embark on the ferry, arrived at the harbor area within 75 minutes of scheduled departure, or by 10:00 AM. Vehicles disembarking the vessel typically offloaded within 15 minutes after the unloading of vehicles commenced. Therefore, disembarking vehicles had vacated the harbor area by 9:45 AM.

- No additional queuing was observed on Pu'unene Avenue as a result of incoming ferry vehicles at any time on any of the four days.

- Departing vehicles were carefully controlled by the TCOs assigned to the ferry in the harbor area. These officers ensured that the queuing of departing vehicles at Ka'ahumanu Avenue did not block vehicles attempting to access the bank parking lot, did not block vehicles accessing other areas in the harbor, and did not block vehicles arriving to board the ferry. The officers also ensured that vehicles were not allowed to leave the harbor area if no queuing space was available on the southbound leg of Pu'unene Avenue.

- Neither study intersection experienced any congestion on any observation day during either the arrival or departure of vehicles associated with the ferry.

- Both intersections operated freely without congestion on all four days during the ferry loading and unloading of vehicles, with little or no queuing of vehicles on any approach of the intersections, and without any delays associated with ferry operations.

On Monday, January 21, 2008, the intersections did become congested from approximately 11:00 AM until 12:00 noon, when the observation of the intersections were concluded. This congestion, which was primarily caused by the higher than normal traffic volumes on Ka'ahumanu Avenue, occurred after all vehicles disembarking the ferry had departed the area, and after all vehicles embarking the ferry had arrived and were either on the ferry or at least within the harbor gates. Discussion with harbor staff and the TCOs indicated that these higher than normal traffic volumes and the subsequent traffic congestion was generated by the holiday activities at the adjacent shopping centers and was totally unrelated to the ferry.

TRAFFIC OPERATIONS WITH VEHICLES FROM FERRY

Fehr & Peers/Kaku Associates assessed the potential impact of the HSF on the two study intersections under existing conditions. The first step in this element of the study was to develop trip generation estimates for the operation of the ferry. These volumes were then added to the two intersections and analyzed to assess the potential impacts.

HSF Trip Generation

The HSF operations and financial plan is based on the assumption that once operation of the ferry normalizes, it will have a daily average of 110 vehicles arriving at and departing from Kahului Harbor. The peak day is projected to generate a demand of 153 vehicles per sailing. These estimates were converted into vehicle trips using the following assumptions:

1. Other than the exception noted in item 5 below, all traffic generated by loading and unloading of vehicles and passengers would occur in one hour.

2. Passengers with vehicles boarding the ferry would generate one vehicle trip per sailing in the inbound (into the harbor) direction.

3. Passengers with vehicles disembarking from the ferry would generate one vehicle trip per sailing in the outbound (out of the harbor) direction.

4. Loading and unloading passengers without vehicles would generate two vehicle trips per sailing, one vehicle trip inbound to pick up or drop off the passenger at the terminal and one outbound to leave the harbor after passenger pick-up or drop-off.

5. Only 90% of the passengers loading onto the ferry (both with and without vehicles) would arrive at the harbor during the peak hour.

These assumptions were used to develop the HSF traffic generation estimates. As shown in Table 3, the average weekday trip generation is 267 vehicles trips per hour and the peak weekday demand is projected to generate a total of 371 vehicles per hour (vph). The peak trips would include 178 vph inbound and 193 vph outbound. These trip estimates were applied to both HSF sailings in the mid-AM and late-PM periods.

Traffic Impact Analysis

As indicated in Table 4, the addition of HSF-generated traffic would result in the intersection of Ka'ahumanu Avenue & Pu'unene Avenue experiencing an additional six seconds of delay during the mid-AM and an additional seven seconds of delay during the late-PM period. Although the intersection delay increases slightly, the intersection continues to operate at LOS C with HSF traffic. At the intersection of Ka'ahumanu Avenue & Wharf Street, the addition of HSF traffic results in negligible increases during the mid-AM and the late-PM periods. The intersection LOS increases to LOS B during the mid-AM and remains at LOS A during the late-PM period with HSF traffic.

Both intersections continue to operate at an acceptable LOS during each period with the addition of HSF traffic.

CONCLUSION

The intersections of Ka'ahumanu Avenue & Pu'unene Avenue and Ka'ahumanu Avenue & Wharf Street currently operate at an acceptable LOS during all peak periods, both with and without the addition of HSF-related traffic. Therefore, the Hawaii Superferry would not have an impact on the operation of either intersection.

TABLE 1
LEVEL OF SERVICE DEFINITIONS FOR SIGNALIZED INTERSECTIONS

Level of Service	Volume/Capacity	Average Stopped Delay per Vehicle (seconds)*
A	0.000 – 0.600	≤10
B	>0.600 – 0.700	>10 and ≤20
C	>0.700 - 0.800	>20 and ≤35
D	>0.800 - 0.900	>35 and ≤55
E	>0.900 - 1.000	>55 and ≤80
F	> 1.000	>80

Source: *Highway Capacity Manual*, Transportation Research Board, 2000.

TABLE 2
EXISTING INTERSECTION LEVELS OF SERVICE

Intersections	Peak Hour	Existing (2008)	
		Del/Veh[1]	LOS
1. Ka'ahumanu Av & Pu'unene Av	A.M.	18.3	B
	Mid-A.M.	22.2	C
	P.M.	27.2	C
	Late-P.M.	21.5	C
2. Ka'ahumanu Av & Wharf St	A.M.	6.7	A
	Mid-A.M.	9.2	A
	P.M.	11.5	B
	Late-P.M.	11.8	B

Note:
1 Delay indicates average stopped delay per vehicle in seconds.

TABLE 3
HSF TRIP GENERATION FORECASTS

HSF Demand Scenario	Trip Generation (Vehicles)		
	Inbound	Outbound	Total
Projected Daily Average	128	139	267
Projected Peak Day	178	193	371

TABLE 4
EXISTING INTERSECTION LEVELS OF SERVICE WITH HSF

Intersections	Peak Hour	Existing (2008)		Existing with HSF		Change in Delay
		Del/Veh[1]	LOS	Del/Veh[1]	LOS	
1. Ka'ahumanu Av & Pu'unene Av	A.M.	18.3	B	18.3	B	0.0
	Mid-A.M.	22.2	C	28.4	C	6.2
	P.M.	27.2	C	27.2	C	0.0
	Late-P.M.	21.5	C	28.6	C	7.1
2. Ka'ahumanu Av & Wharf St	A.M.	6.7	A	6.7	A	0.0
	Mid-A.M.	9.2	A	9.4	A	0.2
	P.M.	11.5	B	11.5	B	0.0
	Late-P.M.	11.8	B	12.1	B	0.3

Note:
1 Delay indicates average stopped delay per vehicle in seconds.

APPENDIX D

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Kahului Commercial Harbor 2025 Master Plan
Draft EA Distribution List

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County of Maui
200 South High Street, 7th Floor
Wailuku, Maui, HI 96793

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County of Maui
200 South High Street, 8th Floor
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County of Maui
200 South High Street, 8th Floor
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County of Maui
200 South High Street, 8th Floor
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County of Maui
200 South High Street, 8th Floor
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County of Maui
200 South High Street, 8th Floor
Wailuku, Maui, HI 96793

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County of Maui
200 South High Street, 8th Floor
Wailuku, Maui, HI 96793

CITIZEN GROUPS, INDIVIDUALS AND CONSULTED PARTIES

Maui Tomorrow Foundation, Inc.
P.O. Box 299
Makawao, Maui, HI 96768

Friends of Haleakala National Park
P.O. Box 322
Makawao, Maui, HI 96768

Mr. Jeffrey Parker, Director
Kahului Harbor Coalition
c/o Tropical Orchid Farm, inc.
P.O. Box 170
Haiku, Maui, HI 96708

Department of the Corporation Counsel
ATTN: JANE LOVELL
County of Maui
200 South High Street, Suite 915
Wailuku, Maui, HI 96793

Goodsill Anderson Quinn & Stifel
ATTN: LISA MUNGER
P.O. Box 3196
Honolulu, HI 96801

SIERRA CLUB - Maui Group
P.O. Box 791180
Paia, Maui, HI 96779

Isaac D. Hall
Attorney at Law
2087 Wells Street
Wailuku, Maui, HI 96793